ORIGINAL ARTICLES.

POST-OPERATIVE INTESTINAL OBSTRUCTION.[1]

BY EUGENE BOISE, M.D.,
OF GRAND RAPIDS, MICH.

I SHALL, in this discussion, exclude all forms of intestinal obstruction that are not direct results of operation, and shall consider post-operative obstruction under two main forms—functional and organic. Under the term functional I shall include two opposite conditions: Tonic spasmodic contraction of the muscular coat of the intestine, and that condition properly designated paralysis. Under the term organic I shall discuss only that form of obstruction caused by adhesions, omitting those that are accidental, as volvulus, incarceration, etc.

In the majority of cases, intestinal obstruction occurring after abdominal operations is due to adhesions, either existing prior to operation and remaining unrelieved, or those which form as the direct result of the conditions caused by the operation. The clear indication in pre-existing constricting adhesions is to separate them at the time of operation. The equally clear indication in the second group is to leave the abdominal and pelvic cavities in such condition as to reduce to the minimum the liability to post-operative adhesions. How to secure this end has been, still is, and will continue to be the object of discussion.

We have, then, post-operative intestinal obstruction occurring:

1. As tonic muscular spasm.
2. As true intestinal paralysis.
3. From the formation of new adhesions.
4. As a result of pre-existing constriction not discovered or relieved at the time of operation.

That we have post-operative obstruction as the result of tonic intestinal spasm is, I believe, not generally recognized, but this condition may, and often does, occur as the result of violent stimulation of the muscles of the intestine. Landois and Stirling[2] say: "All stimuli applied to the plexus mesentericus increase peristalsis . . . which may even produce spasmodic contraction of the musculature of the intestine." Murphy relates a case[1] of lead-poisoning with absolute obstruction, which had continued five days, and in which operation revealed tetanic spasm of the muscular coat of the small intestine for a space of eight inches, so severe as to cause entire obliteration of the canal. This spasm, however caused, may persist till death. Ashton[2] relates two cases where this condition was revealed at the autopsy, one case occurring in his own practice, where death occurred on the fifth day. Autopsy revealed a tonic contraction of the small intestine for a space of about eight inches above the ileocecal valve, the canal being rendered impermeable. There were no adhesions and no signs of peritonitis. His second case was reported by Dr. Baldy, following hysterectomy. The abdomen was reopened on the sixth day, but death resulted twenty-four hours later. Autopsy revealed no peritonitis, no adhesions, but "the intestine was contracted in one or two places so as to feel like hard cords."

Intestinal peristalsis is directly under the control of the sympathetic system of nerves, and is influenced in two ways: (1) By stimuli applied to the motor nerves at their origin, during their course, or at the terminal ganglia in the muscles themselves; and (2) by agencies which influence the vascular supply. Stimulation of the motor or vasomotor nerves causes increased peristalsis; over-stimulation causes spasmodic contraction, which may become tetanic.

As shown in the case cited by Murphy, lead-poisoning may cause tetanic contraction of the intestinal muscles, because of the direct irritant action of the poison on the nerves controlling these muscles. Other poisons have a similar action. Excessive electrical stimulation will produce the same condition; and the cases reported by Dr. Ashton show that there are conditions resulting from operation that will cause the same result. In the consideration of the question as to what these conditions are, we must bear in mind the nervous mechanism of the intestinal muscles; that the nerves belong to the sympathetic system and arise from the various abdominal plexuses; that these nerves terminate in a fine network of ganglionic cells, known as Auer-

[1] Candidate's paper, presented for admission to the American Gynecological Society, May, 1896.
[2] "Manual of Physiology," p. 318.

[1] Jour. Am. Med. Assn., January 4, 11, 1896.
[2] Jour. Am. Med. Assn., July, 1892.

bach's plexus, situated in the muscular tissue itself; and finally that an irritant applied to the mucous lining of the canal, to its serous covering, to the nerves in their continuity, or to their origin in the various plexuses, will cause muscular contraction, and that the severity of this contraction will be proportionate to the nature and severity of the irritant impulse. This, I may say, is the keynote of the pathology of intestinal obstruction from tonic spasm. This irritant impulse may be direct, it may be reflex, or it may act through the vasomotor nerves of the intestines.

Brunton and others, by accurate experiment, have determined the fact that excess of venous blood in the intestine excites peristalsis. Therefore, any impulse that causes contraction of the arterioles, and consequent arterial anemia, causes increased peristalsis. It therefore follows that tonic spasm of the intestine may be brought about by excessive irritation of the motor nerves governing the intestinal muscles, and that this spasmodic impulse may be aggravated or exaggerated if, at the same time, the vasomotor nerves of the intestinal vessels are irritated.

There is always more or less violence to the motor mechanism of the intestinal canal during severe operations within the abdominal cavity. This violence necessarily acts as an irritant to the nerves and muscles of the intestines and causes exaggerated and irregular peristaltic action, which may be so severe as to cause intestinal obstruction by tonic spasm. This condition has been often mistaken for paralysis, but the term intestinal paralysis should be restricted to that condition of the intestinal muscle where its contractility is destroyed, the tube being dilated, rather than contracted. It may occur as a result of "muscle tire,"[1] following the excessive muscular action described above, as a result of any factor that causes pathological infiltration of the intestinal walls, or as the direct result of section of the nerves.

The first condition, muscular exhaustion, need not be dwelt upon, as it is properly an extension or sequel of excessive muscular action. The second condition may arise (1) from peritonitis, sepsis, etc., and (2) from any cause that cuts off the arterial blood-supply, as thrombus, volvulus, etc. Maas[2] relates a case (not following operation) where the intestinal wall for a space of several feet was thickened and infiltrated with pus, causing fatal obstruction. The direct cause of the infiltration was not demonstrated, but in the absence

of signs of peritonitis, was thought to be due to thrombus of an artery.

Stumpf, of Munich, in a paper read before the sixth session of the Deutsche Gesellschaft für Gynæcologi, at Vienna,[1] mentions expressly as one of the factors of "Darmlähmung" eventration of the intestines. Freund, in the course of the discussion of this paper, laid special stress on eventration as a cause of intestinal paresis, but stated that, in his opinion, the cause of ileus was due, in the majority of cases, to general or circumscribed peritonitis. Some writer has stated that eventration causes a serous infiltration of the walls of the intestine, and consequent muscular paralysis. However that may be, it is probable that eventration, or long exposure of the intestines to the air, may cause true paresis in many cases, and that the effect of such exposure tends in all cases toward paresis, rather than toward spasm. We are confirmed in this belief by the combined testimony of operators, by the case of Dr. Murphy, above cited, where a spasmodically contracted intestine, which had caused total obstruction for several days, rapidly relaxed when exposed to the air, and by the fact that intestines exposed to the air for any considerable length of time become distended with gas. Again, I can conceive that bruising of the intestinal wall, as by violent and injudicious effort to release adhesions, may cause direct muscular paralysis. However this may be, we still have as operative causes of functional intestinal obstruction, severe irritation of the nerve supply, causing persistent tonic spasm, and local or general peritonitis, obstruction of arterial or nervous supply, and eventration, causing true paralysis.

Organic obstruction may be caused by preexisting bands or by post-operative adhesions. Those adhesions that exist prior to operation are due to former peritonitis, and should be released at the time of operation. They therefore merit no further discussion in this connection.

But it is a very pertinent question, how shall we reduce to the minimum the liability to the formation of adhesions after operation? A tendency to adhesion is a peculiarity of serous membrane; and yet, as long as the integrity of its epithelium is preserved, it will remain in close contact with an opposite intact serous surface with no tendency to adherence. It would therefore appear that the one important indication is to preserve the epithelium intact to as great an extent as possible. In making a diagnosis in cases of post-operative intestinal obstruction, it is

[1] " Landois and Stirling," p. 318.
[2] *Annals of Gynecology*, February, 1895.

[1] *Centralblatt für Gyn.*, June, 1895.

practically only necessary to differentiate between functional obstruction and organic, inasmuch as such decision indicates the line of treatment. In making this diagnosis, we shall be obliged to rely mainly upon the history of the case, inasmuch as the symptoms of obstruction vary very little, whatever the cause.

After nearly all abdominal operations, even of moderate severity, there is transient obstruction, the evidence of which is intra-abdominal pain, more or less spasmodic in its nature, and generally referred to a point at or near the seat of the greatest violence. This may be caused, in part, by the constricting ligature about the stump, but is largely caused by irregular, exaggerated (or even spasmodic) peristaltic action, an effort on the part of normal intestine to overcome obstruction at this point. This obstruction, in the absence of any history of prolonged exposure of the intestines, or of partial preëxisting obstruction, may fairly be attributed to intestinal spasm, which, undisturbed, always tends to speedy relaxation, with reëstablishment of normal peristalsis. If, however, this condition be aggravated by injudicious treatment, tetanic contraction may occur, which may persist till death, or it may give rise to actual, fatal intestinal paralysis, the result of muscular exhaustion. If there has been eventration of the intestines, or prolonged exposure to the air, the condition may well be, from the first, paresis of that portion of the bowel so exposed with exaggerated peristalsis of the healthy intestine. Or if the symptoms only show themselves with the onset of peritonitis, the condition is one of true paralysis, due to involvement of the muscular coat in the inflammatory process. In intestinal paralysis we should expect more or less gaseous distension. In tonic spasm this would probably be absent till a condition of muscular exhaustion ensued.

Again, if several days have elapsed before the symptoms of obstruction show themselves, especially if for a longer or shorter period flatus has been passed, and if there is an absence of signs of peritonitis or sepsis, we may be confident that we have to do with organic obstruction due to post-operative adhesions. Like the occurrence of post-operative hemorrhage, the question as to obstruction is largely decided at the time of operation, and our discussion of the treatment must involve to a certain extent a discussion of technic. It is important, therefore, in making an abdominal operation, that we continually keep before our minds not only those conditions that predispose to hemorrhage and sepsis, but equally those that tend to impairment of function of the intestinal canal.

Inasmuch as irritation of the motor nerves at their origin, in their continuity, or at the terminal intermuscular plexus, tends to promote excessive contraction of the muscles; and inasmuch as *severe* irritation may cause tetanic contraction, it follows that we should, during the operation, use all possible precaution that we may reduce to the minimum such irritation. This suggests the use of the smallest abdominal incision compatible with skilful work. The early and free use of the Trendelenburg position in cases where it is not absolutely contraindicated, and tender, skilful, delicate manipulation of the intestines themselves in the separation of adhesions. That we should avoid eventration of the intestines, or their prolonged exposure to the air, goes without saying. But it is probable that in the majority of cases post-operative intestinal obstruction is due directly to adhesions, which form as a result of conditions caused by the operation. This has long been recognized, and many efforts have been made to devise some means by which it can be avoided. Martin has used sterilized olive oil; Morris has used and still uses aristol to cover the denuded surfaces. Other measures have been suggested, but have proved ineffective.

There are several general principles to be kept in mind: (1) That while intestines whose peritoneal epithelium is intact will adhere to raw surfaces, much more quickly and readily will this occur if their peritoneum is abraded. (2) While they will form adhesions to an opposite abraded peritoneal surface, much more readily will they adhere to a raw surface; and (3) that two surfaces denuded of their peritoneum will almost certainly adhere.

What steps can we then take to reduce the formation of adhesions to a minimum? First, as I have remarked, avoid all unnecessary handling of the intestines. This is extremely important, and to this end the aid of posture must be invoked. Every foreign body that touches an intestine robs it correspondingly of its epithelium. It often becomes necessary to wall off the abdominal cavity, or to hold the intestines away by the interposition of gauze sponges or towels. This is an evil that should be absolutely avoided when possible, but when they must be used, let it be with the least possible violence and manipulation. Sänger has urged that, while dry gauze will, without question, remove the epithelial covering of the peritoneum, gauze saturated with a warm soda-salt solution will do much less vio-

lence, and that therefore such solution should be used. Other operators have, after trial, denied this. I believe it to be advantageous. The use of gauze packing to check excessive oozing predisposes to the formation of adhesions. It has been suggested that it might be avoided by the use of steam as advocated by Segeriff to check the bleeding, drainage being secured by the use of a glass tube, instead of gauze.

Again, it is an established principle of abdominal surgery that, where it is possible, raw surfaces should be covered with peritoneum. Much can be done in this line in the treatment of the stump left after removal of an ovary and tube. In a case uncomplicated by adhesions, the appendages can be enucleated according to the method employed by Dr. Pratt of Chicago, with almost no bleeding, and the edges of the peritoneal surfaces of the broad ligament be brought together by a continuous catgut suture, leaving only a linear denudation. Or a chain ligature may be used and the peritoneal surfaces united. A broad, thick stump is undesirable, as neither oil, aristol, nor the cautery will prevent adhesions.

After all serious abdominal operations, especially when complicated by adhesions necessitating more or less violence to the intestines, there is irregular, painful peristalsis during the first twenty-four hours or more. It is then that tonic spasmodic contraction of the intestinal muscles occurs. I have said I believe this occurs oftener than is recognized. In support of this view, let me again mention the two cases reported by Dr. Ashton, where autopsy revealed this condition. Another case was reported to me by Dr. O. E. Herrick, of obstruction following laparotomy, which resisted all measures to provoke a fecal movement, or even the escape of flatus, till finally, in desperation, a quantity of tobacco smoke was thrown into the rectum. In a very short time free fecal evacuations occurred. In my own practice, after a laparotomy for the removal of pustubes, efforts to produce catharsis resulted only in the production of nausea and vomiting, which rapidly became fecal. There was only moderate abdominal distension. The pulse and temperature did not indicate sepsis, and yet the most faithful and persistent effort failed to even provoke an escape of flatus. To give the patient temporary relief from the persistent vomiting, I gave a large hypodermic injection of morphin. Within one-half hour her bowels moved *copiously*.

The condition in these cases was, I am confident, tonic obstructive spasm of the intestines, aggravated by injudicious treatment. The indication in such cases is to cause relaxation of the spasm, and thus relieve the obstruction. For this purpose no drug is equal to opium in some form, preferably codein, because of its freedom from nauseating tendencies. In saying this, I am aware that I am advocating that which, in the opinion of many, is heresy. There are those who, in the strongest possible terms, condemn the use of an opiate after abdominal section, but I contend that by the free use of codein during the twenty-four or thirty-six hours immediately following an abdominal operation, the best interests of the patient are conserved. It not only relieves the pain (often severe), but, by its sedative action on the sympathetic nervous system, allays irritation and converts irregular spasmodic intestinal contraction into normal, painless, though active, peristalsis. I always use it freely in this manner, and have never had occasion to regret it. Under its use normal peristalsis, as evidenced by the escape of flatus, is more quickly established, and instead of delaying catharsis, it makes it more easily possible.

The very early use of cathartics in cases of spasmodic abdominal pain after section I cannot sanction. This pain is, as I have said, caused by irregular obstructive intestinal contractions, and the use of a cathartic before normal peristalsis has been restored aggravates the existing irritation. Sedatives are indicated. The condition is parallel to that existing in lead-colic, where no remedy will overcome the existing constipation and promote an evacuation of the bowels as readily or certainly as a free use of opium. Or to those cases cited by Brunton, of obstinate constipation complicating ovarian neuralgia, where opium not only relieved the neuralgia, but produced catharsis.

It may be urged that the use of codein after abdominal section will tend to promote the formation of adhesions by preventing peristalsis, but I cannot think so. The conditions are abnormal. It must be remembered that the intestines are no longer quiet. In addition to the stimulus of irritated nerves, there is the normal stimulus of gas in the intestinal canal. The intestines are no longer empty and flattened as at the beginning of the operation, but by the processes incident to the operation there has been a formation of more or less gas, supplying a normal stimulus to peristalsis within the canal itself. Moreover, the peristalsis is not normal nor regular. It is more or less spasmodic, even obstructive. Codein, properly used, instead of quieting normal peristalsis and allowing adhesions to form, quiets excessive peris-

talsis, regulates the action of the intestines, and renders the production of catharsis possible at an earlier period than by any other means. I believe that in serious abdominal operations the exhibition of cathartics by the stomach should be avoided till it is shown by the escape of flatus that normal peristalsis has been reëstablished, but that we should rely on the free use of codein, supplemented, if necessary, by the use of high enemata.

If, after judicious trial of the measures above detailed the symptoms of obstruction persist, the abdomen should be reopened and the cause of the obstruction sought. Nor should we hesitate to incise the intestines, if necessary, to reduce their volume. For organic obstruction there is no other remedy.

A NEW TREATMENT OF DIPHTHERIA—THE INTRAVENOUS INJECTION OF MERCURIC CHLORID. A THERAPEUTIC SUGGESTION.

By WALTER L. PYLE, A.M., M.D.,
OF WASHINGTON, D. C.;
FELLOW OF THE AMERICAN ACADEMY OF MEDICINE; FORMERLY RESIDENT PHYSICIAN IN THE EMERGENCY HOSPITAL, WASHINGTON, D. C.; MEMBER OF THE MEDICAL ASSOCIATION OF THE DISTRICT OF COLUMBIA, ETC.

SINCE calling the attention of the English-speaking medical profession, some fifteen months ago, to the superlative merits of the intravenous injection of mercuric chlorid in obstinate cases of organic syphilis, as practised by Professor Guido Baccelli of Rome, it has occurred to me to suggest a new field for this valuable method of medication—its use in the treatment of diphtheria.

Although to my knowledge this suggestion is original and is unsupported by clinical evidence, I feel justified in offering it to those practitioners who, either in their official or private capacities, come in constant contact with diphtheria, and I believe that a careful trial of this method will result in establishing a formidable means of combating this dreaded disease.

My reasons for this suggestion and my belief in its efficacy, despite the absence of clinical proof, which in the last year has all been directed to the serumtherapy, are as follows: (1) *The intravenous injections of mercuric chlorid are absolutely harmless*, and can be practised without pain to the patient. In such a fatal disease as diphtheria any harmless and promising method of treatment is worthy of a trial, particularly if it is not necessary to suspend any other treatment in order that it may be used. There is no reason why any of the local medications now in practice cannot be used in conjunctions with the intravenous injections. Physicians feeling assured of the reliability of the antitoxin serum, need not omit it, but use the intravenous injections conjointly. The advantage will show in the resultant mortality of the series of cases treated. (2) There is greater certainty and rapidity of absorption and therapeutic effect in the intravenous medication than in any other, which in diphtheria, of all diseases, is most necessary. A few hours gained in the treatment of diphtheria will often avert a fatal issue. The system reinforced for the combat with the toxin is less liable to be overcome, and the patient rendered helpless. (3) The therapeutic value of mercuric chlorid in the treatment of diphtheria is universally acknowledged. In addition to its established influence in lessening the plasticity of the blood, and thus diminishing fibrinous exudation, mercuric chlorid has a preservative and tonic influence on the corpuscular elements of the blood, and reinforces them against such a powerful factor of disintegration as the toxin of the Klebs-Loeffler bacillus. (4) Mercuric chlorid is one of the strongest germicides at our command. Distributed directly through the circulation to the points of infection, the maximum degree of germicidal action can be obtained. Germicides applied externally to the infected surfaces rarely reach the bacilli that are imbedded securely in the submucous tissues, and are afforded extra protection by the fibrinous exudation. It is quite possible that the intravenous injections of mercuric chlorid not only combat the disastrous effects of the toxin, but also the bacilli themselves are enfeebled by the extra amount of antisepticized blood that is called forth by the inflammatory changes in the mucous membranes. (5) Experience has proven that the therapeutic value of mercuric chlorid in diphtheria is in direct ratio with the amount of drug employed. By the intravenous injections the maximum influence of the salt can be obtained without untoward salivation or distressing gastric or dermal symptoms. A small dose administered intravenously is more potent than a much larger one given otherwise. Although great tolerance for mercuric chlorid, as well as all other mercurial salts, is shown by diphtheritic patients, yet it often happens that the ordinary administration of mercury is seriously interfered with by the foregoing complications, which sometimes even forbid its further use. (6) In spite of the persistent and meritorious investigation in the therapeusis of diphtheria no remedy is specific, and the limitation of medical science in combating the effects of the Klebs-Loeffler bacillus is a lamented fact. The intravenous injection of mercuric chlorid offers a new addition

to our medical armamentarium. It follows no new theory, it is not a fad, and to me seems substantiated by the simplest and soundest of reasoning.

It is not in the province of this paper to review the advantages of intravenous injection as a method of medication, this I have already done in THE MEDICAL NEWS of February 23, 1895, (a comprehensive epitome of which can be found in the *British Medical Journal* of August 17, 1895). The *safety* of the method and its efficacy in the treatment of syphilis has been firmly established by the Italian school, and the interested reader is referred to my paper, or to the originals in Italian of Baccelli,[1] Jemma,[2] Dagnino,[3] Colombini,[4] and Nieddu.[5] DeVecchi, now in San Francisco, has followed his *confrères* in an exhaustive exposition of this method, and Blaschko[6] has reviewed it in Germany, calling especial attention to the small amount of the drug that will prove efficient, when given in such a way that all the dose becomes effective.

For the convenience of those who are unfamiliar with the technic of the method I will quote briefly from my former article:[7]

"In the preparation of the fluid for injection the following formula is used:

℞   Mercuric chlorid   .   .   .   1 grm.
     Sodium chlorid   .   .   .   3 grms.
     Water   .   .   .   1000 grms.

A small quantity of alcohol may be added to facilitate solution. The mixture should be well stirred and filtered until perfectly clear. It is advisable, but not necessary, to sterilize it, both to be perfectly aseptic and to facilitate solution.

A ligature is applied above the elbow, and any one of the superficial veins in the neighborhood, which soon become prominent, may be selected as the point of injection. The point selected and the surrounding area are then thoroughly scrubbed and disinfected with a $\frac{1}{1000}$ solution of mercuric chlorid or a five per cent. solution of carbolic acid. The needle, previously sterilized, is plunged directly toward the center, at the point selected, and a few drops of blood allowed to ooze out, assuring entrance into the vein; the barrel is then carefully applied, avoiding any entrance of air. [8]

Loosen the ligature and make the injection, at first using only one gram of the solution, and progressively increasing to as high as four grams at

[1] *Gaz. med. di Roma*, 1893, xix, 241–245.
[2] *Riforma Med. Napoli*, 1893, ix, pp. 3, 159–163. *Cronaca de Clin. Med. di Genova*, 1892–93, p. 266, or *Boll. di R. Accad. Med. di Genova*, July, 1893.
[3] *Gazette Deg. Osped. e Del. Clinic*, 1894.
[4] *Atti della R. Acad. de fis in Siena*, iv, vol. v.
[5] *Gior Med. del R. Marina*, November, 1893.
[6] *Berlin. klin. Woch.*, November, 1894.
[7] MEDICAL NEWS, February 23, 1895, p. 197.
[8] Recent experiment has shown that a small quantity of air can be injected intravenously into a rabbit without any harmful effect.

a dose if necessary. Occasionally on the withdrawal of the needle there is some extravasation of blood into the neighboring subcutaneous tissue; but this is absorbed very quickly, and is only of casual occurrence. Repeated injections can be made in the same vein. Jemma reported a case in which he made seventy-five injections into the median cephalic vein. This vein and the median basilic are the best to use.

There are two precautions that should be remembered: First, always use a fresh solution, which the physician should prepare himself, to be assured that the salt has not decomposed, which is often the case after the solution has been standing some time. No after-dressing is needed, and it is not necessary to cover the wound of puncture with collodion. Second, do not use a concentrated solution. That of $\frac{1}{1000}$ is to be prepared, but in late injections a $\frac{1}{500}$ solution may be used." [1]

In young children it would perhaps be advisable to start with less than one gram of the solution (.001 gram of the salt), one-half gram of the solution would be sufficient for the first injection, and then increase to 1, 1½, and 2 grams.

Intravenous medication is in its infancy, and it seems possible that this means of administering drugs, with its many advantages, will be universally used when a speedy and maximum effect is desirable. It offers a comparatively unexplored field for experimentation.

THE SIGNIFICANCE OF MURMURS IN THE DIAGNOSIS OF VALVULAR DISEASE OF THE HEART.[2]

BY ALOYSIUS O. J. KELLY, A.M., M.D.,
OF PHILADELPHIA;
VISITING PHYSICIAN TO ST. MARY'S HOSPITAL; PATHOLOGIST AND CLINICAL ASSISTANT TO THE NEUROLOGICAL DEPARTMENT OF THE PHILADELPHIA POLYCLINIC; PATHOLOGIST TO ST. AGNES' HOSPITAL; ASSISTANT TO THE MEDICAL DISPENSARY AT THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA.

AN acquaintance with the facts renders patent to the observer the avidity with which many practitioners are prone to regard as pathognomonic a sign or symptom of value, though it be yet far from possessing the dignity and importance which they attach to it. Pathognomonic signs are rare, extremely rare; they rarely ever exist. A profound acquaintance with the exact relationship existing between pathological processes and signs and symptoms of disease is the *sine qua non* of accurate diagnosis. I know of no circumstances under which a lack of appreciation of this neces-

[1] I will be glad to furnish literature on this subject to physicians not having the references quoted at their disposal.
[2] Read at the meeting of the Medical Society of the State of Pennsylvania, Harrisburg, May 19–21, 1896.

sity, from ignorance or other causes, is attended by such frequent and needless diagnostic errors, as in estimating the significance of murmurs in the diagnosis of valvular disease of the heart. We are often told that a patient with an adventitious sound heard at the apex of his heart or thereabout has a mitral murmur, and forthwith we are expected to believe that he has some disease of his mitral valves, which on the autopsy table is, but too frequently, found to have "vanished into the thin air."

The study of the exact significance of murmurs in the diagnosis of valvular disease of the heart may not inappropriately be prosecuted by arranging our cardiac cases into three distinct classes: (1) Cases in which the presence of a murmur assists in the diagnosis of some valvular lesion; (2) cases in which, despite the presence of a murmur, valvular disease may not be diagnosed; (3) cases in which valvular disease may be diagnosed without the detection of any murmur whatever. In the present communication these classes can be but alluded to. Nor can we go fully into the question of the diagnosis of valvular disease of the heart. We can do no more than merely indicate the value of other diagnostic signs, directing our attention at present solely to murmurs.

It is in cases belonging to the first two categories, cases in which we may detect a murmur in the region of the heart, that most mistakes are liable to occur, especially in view of the much greater frequency of these classes of cases. In pursuance whereof, it may therefore be remarked as the actuating motive of this communication, that a murmur alone, that is, without corroborative evidence is never diagnostic of any valvular disease of the heart. Disease at any orifice of the heart so disarranges the mechanism of a rhythmically acting and perfectly regulated machine as to of necessity always lead to consecutive changes, without the detection of which, the diagnosis of such valvular disease is never justified.

The first requisite absolutely essential to the accurate diagnosis of valvular or other disease of the heart is a thorough physical examination of the lungs and pleura. We must first determine whether or not there be present any acute or chronic, local or general, disease of the lungs or pleura. For the varying states of health and disease, to which the lungs and pleura are subject, find an expression to a certain, often marked, degree in the condition of the heart; which condition is very frequently similar to that which follows in the wake of certain valvular lesions. The

truth of this statement is apparent when we consider that the accentuation of the second pulmonic sound which plays such an important rôle in the diagnosis of certain valvular lesions of the left side of the heart, is also present in cases of pneumonia, as well as in cases of pleural effusion, and the more chronic affections, such as emphysema, etc.

Considering then the question of murmurs, a murmur heard in the region of the heart must be first definitely determined to be of endocardial origin. We must eliminate all questions of exocardial genesis, all pericardial, cardio-pulmonary, so-called hemic and venous murmurs. It will be neither appropriate nor opportune to here enter upon this subject in detail. We recognize then that a murmur heard in the region of the heart may be due to incompetency of the valves or to stenosis of the orifices consequent upon endocarditis or atheroma; to dilatation of the ventricle or relaxation of its walls, inducing a relative insufficiency of the valves; to irregular action of the heart; to roughening of the pericardial surfaces (pericarditis, pleuritis) ; to anurism; to alteration in the constituents of the blood, anemia and chlorosis; to murmurs produced within the veins; to various anomalous conditions of the chordæ tendineæ; and to various congenital defects of the heart itself or great vessels.

We will consider somewhat in detail the most commonly occurring murmurs, without regard to the accuracy of the diagnosis of the murmur as such. I wish not only to refer to the positive signs of valvular disease but I desire also to direct some attention to the value of what may be termed the negative signs of the individual lesions. And firstly, the systolic murmur with its area of maximum intensity in the region of the apex beat, usually designated the mitral systolic murmur, and which, when detected, is usually considered sufficient evidence to consign the patient to the inconveniences and consequences of a mitral insufficiency, and which when absent usually presupposes the non-existence of such lesion. And yet how frequently is the hemic murmur of chlorosis and the other anemias heard loudest at the apex and during the systole ? And how many pericardial, and cardio-pulmonary or pleuro-pericardial murmurs have their point of maximum intensity at, or are heard only in the same region, and are audible, or thought to be audible, only during systole ? And on the other hand, how frequently is the murmur of mitral insufficiency not heard with maximum intensity in the region of the apex, but upward toward the

pulmonary cartilage where we usually hear loudest the so-called hemic, or accidental, or functional murmurs? The importance of a correct diagnosis is further emphasized by the fact of the frequent occurrence of these accident murmurs in apparently healthy individuals. They are usually demonstrable in most delicate women, especially in those who have thin chest-walls, and are of very frequent occurrence in young children, more particularly in those who, for any reason, are somewhat below par.

They are especially audible in the recumbent posture. This is also frequently true of the organic murmur of mitral incompetency, which may even be entirely absent at certain times, as during intercurrent diseases and in conditions of weakness and exhaustion. The diagnosis of a mitral insufficiency is justified only, when in addition to a mitral systolic murmur there are present the confirmatory evidences of the consecutive changes which such a lesion necessarily induces in the heart. We must determine the characters of the heart sounds at the apex and at the base (accentuation or not), the character of the apex beat, the area of the cardiac dulness, the condition of the precordium, the presence or absence of a thrill.

Illustrating the care essential in making a correct diagnosis, I may cite the case of a young woman suffering from an attack, which was the second, of acute articular rheumatism, when I first saw her. In conjunction with other physicians I saw her almost daily for a couple of months and carefully watched the sequence of events. During the attack of rheumatism her heart remained absolutely unaffected. As defervescence was established and convalescence begun she became very anemic. There developed a blowing systolic murmur heard loudly at the apex, but apparently with its point of maximum intensity up toward the pulmonary cartilage. There occurred some slight increase in the transverse area of the cardiac dulness. Otherwise physical examination of the heart revealed nothing abnormal. In this instance the natural inference most probable to many would have been the development of a mitral insufficiency due to endocarditis, attendant upon an attack of acute articular rheumatism. While there existed many reasons in support of such a diagnosis, weighty elements in confirmation were wanting, and there existed many negations. For the supposition of a mitral insufficiency there were the history of rheumatism, a systolic murmur heard loudest in a region where the systolic murmur of mitral insufficiency is sometimes located, and some increase in the transverse area of the cardiac dulness. But the patient had a marked anemia, the murmur was of the character and located where the hemic murmurs are most frequently heard, there was no accentuation of the second pulmonic sound, the first sound at the apex was preserved, and the slight increase in the transverse area of the cardiac dulness could readily be explained upon the assumption of a slight dilatation of the heart dependent upon the anemia. While the case might well be thought doubtful, this latter supposition was indulged in and subsequent events proved its justification. As the anemia improved so also did the physical signs of the heart; the murmur disappeared and the area of cardiac dulness once more assumed its normal limitations. The patient was seen again some months after she left the hospital, and there existed no physical signs or indications whatever of cardiac disease; the heart sounds were normal, there was no murmur, no accentuation of the pulmonic second sound, no increase in the area of cardiac dulness, no change in the precordium, no alteration in the pulse; her anemia was gone, so also were all her suspicious signs of valvular disease. The case was not one of relative mitral insufficiency, as whether relative or due to endocarditis, the physical signs of a valvular lesion, upon which the diagnosis is to be based, are the same.

A stenosis of the mitral orifice is usually diagnosed, and only then, when there is detected a diastolic or a presystolic murmur with its area of maximum intensity at the apex. This diastolic or presystolic murmur is usually said to be strictly localized at the apex, to indicate the fallacy of which statement I need but refer to the very old testimony of Bamberger, [1] or to the more recent communication of J. P. Crozer Griffith.[2] The latter diagrammatically illustrates the very wide area of distribution of many presystolic and diastolic murmurs of mitral stenosis. Of all cardiac murmurs the presystolic at the apex is usually said to be the one pathognomonic; being a positive indication of mitral stenosis. This statement is equally as fallacious as the preceding one, regarding its limitations of distribution. For many years, since Austin Flint first promulgated the statement, we have been accustomed to occasionally hearing a presystolic murmur at the apex in cases of aortic incompetency, and such a murmur has usually gone by his name. More recently Fischer[3] and Phear[4] have contributed to the lit-

[1] "Lehrbuch der Krankheiten des Herzens," 1857, p. 248.
[2] American Journal of the Medical Sciences, September, 1895.
[3] Lancet, March 5, 1895.
[4] Lancet, September 21, 1895.

erature of the subject, the latter collecting 48 cases of presystolic apex murmur without mitral stenosis. In 17 of these cases the aortic valves were incompetent, in 20, the pericardium was adherent, and in 13 there was present either a presystolic or a diastolic thrill. It has long been known that there may occur at the apex a presystolic or a diastolic thrill without any murmur being audible, the thrill in such cases being considered pathognomonic of the mitral stenosis. But from the evidence adduced by Phear this can no longer be considered consistent with the facts. A presystolic murmur at the apex may therefore not only be due to a mitral stenosis, but may likewise owe its origin to an aortic incompetency or to an adherent pericardium. It has also been suggested that in certain rare instances, either one or two conditions, shortening of the chordæ tendineæ, or dilatation of the left ventricle, with in either case the necessary addition of a sufficiently forcible contraction of the left auricle, may serve to produce the murmur. The condition of the chordæ tendineæ was mentioned in 9 of the cases referred to by Phear. In 3 they were healthy; in 2 shortened; in 1 shortened and thickened; in 3 thickened but not shortened. In one of the last mentioned cases there was also an adherent pericardium. It has also been suggested that in those rarer instances of presystolic apex murmur attendant upon aortic incompetency or adherent pericardium, the innervation of the heart may be in some obscure way affected, giving rise to the production of the murmur.

And further a mitral stenosis is frequently to be diagnosticated without the detection of any murmur whatever. One can at least think of the presence of a mitral stenosis when a well-marked hypertrophy of the right side of the heart and accentuation of the second pulmonic sound cannot be accounted for by any existing conditions of the lungs, and when for the accompanying weakness and smallness of the pulse no plausible explanation can be found. The presystolic murmur of mitral stenosis may be absent for months at a time, and is especially liable to be found wanting toward the close of life when cardiac weakness begins to manifest itself. Requisite for the production of the murmur is a certain strength of the left auricular contraction, which with the increasing exhaustion toward the end of life necessarily suffers.

The unwary are thus often surprised to find *post-mortem* a mitral stenosis unsuspected during life.

Again, there is another class of cases in which we can detect no presystolic or diastolic murmur, and in which the diagnosis of mitral stenosis can be made with absolute certainity. I refer to cases in which there is a reduplication of the second sound heard at the apex alone, or at least at the apex with greatest intensity. Reduplication, or splitting of the second sound, at the base of the heart is devoid of much diagnostic significance. But a reduplication of the second sound heard only at the apex, there being no such reduplication audible at the base, is diagnostic of mitral stenosis. This so-called reduplication of the second sound, which in fact occurs in quite a number of the cases of mitral stenosis, is in reality not a reduplication or splitting of the normal second sound of the heart, but is the addition of a distinct and independently produced third sound, an abnormal diastolic or presystolic tone. It is produced by the auricular contraction causing a sudden and violent presystolic impact of the blood against the pathologically tense and nonretracting mitral valves. Unless the valves have become too stiff to permit of the production of any sound at all, this abnormal sound is frequently very readily heard if it be not obscured by a coexisting or replacing murmur. This triple rhythm of the cardiac sounds may often be the only auscultatory signs of mitral stenosis. It is most frequently observed during quiet cardiac action, to be usually replaced, during excited action, by the normal double rhythm of the cardiac sounds, and a diastolic or presystolic murmur.

Particularly are we to exercise care in the diagnosis of single lesions at the mitral orifice; they are of rather infrequent occurrence. Stenosis of the mitral orifice is almost always accompanied by incompetency of the mitral valves, while the majority of cases of mitral insufficiency are attended by some degree of stenosis of the orifice. The valvular incompetency is usually the antecedent affection, the stenosis developing subsequently. We must be careful not to mistake a stenosis for an insufficiency, or a double lesion for a single one. Frequently the stenotic murmur failing, we have present only the systolic murmur of the coexisting mitral insufficiency. We must have recourse to the other physical signs in addition to the murmur. The preponderating lesion can be diagnosticated by attention to the physical signs of the individual lesions which in the single case may be more in evidence.

The murmurs produced at the aortic orifice, and usually heard with maximum intensity at or near the aortic cartilage, are the aortic systolic and aortic diastolic murmurs; and I know of no

signs, in the proper interpretation of which more errors are made than in correlating these two murmurs to the pathological conditions which give rise to them. The murmur of aortic incompetency is diastolic in time, in pursuance whereof to many, all diastolic murmurs heard with maximum intensity in the region of the aortic cartilage of necessity indicate, and the murmur alone is sufficient to diagnosticate, an aortic insufficiency. In addition to giving rise to an aortic diastolic murmur an aortic incompetency will surely be productive of other evidences of deranged cardiac mechanism without the demonstration of which the diagnosis of an aortic insufficiency is never justifiable.

We must have recourse to the other signs of the valvular lesion, and consider the character of the heart sounds at the apex and at the base, determine the area of cardiac dulness, the characteristics of the apex beat, the presence or absence of a thrill, the condition of the precordium, the pulse, the results of auscultation of the arteries, etc.

It may be asserted that an aortic diastolic murmur will so surely be accompanied by other evidences of aortic incompetency as, for diagnostic purposes, to render almost needless such careful examination; in other words. that an aortic diastolic murmur is pathognomonic of aortic insufficiency. And I will even grant that in the majority of cases this may be true, but it is not invariably so. The hemic murmur at the base of the heart, being systolic in time, will of course not be mistaken for that of aortic insufficiency. But there are other signs attendant upon anemia which may lead to confusion. I refer to the bruit in the veins. This so-called "bruit de diable" has long been known to be audible in the jugular veins, and can occasionally be heard in other veins. It is a continuous murmur, and as such it is usually appreciated. It suffers systolic and diastolic augmentations, although the latter, because of the much easier flow of the blood during that time of the cardiac cycle, is much the more intense. This murmur is not only audible in the veins of the neck, but can very frequently be heard along the right border of the sternum as far down as the second or third rib, exceptionally still lower. When heard, however, in this region, that is at the base of the heart, it usually appears simply as a diastolic murmur. Under these circumstances, attaching itself, so to speak, to the second sound of the heart, it may readily be mistaken for the diastolic murmur of aortic insufficiency. Exceptionally this murmur may be heard with great intensity

low down the sternum, in which case it is probably transmitted from the inferior vena cava. This venous murmur is occasionally present in apparently healthy individuals, but is most frequently observed in those the subjects of anemia, especially chlorosis. It is of very frequent occurrence in children, as has been especially pointed out lately by Sainsbury,[1] who found it present in thirty-four of one hundred children whom he examined. These children, while possibly somewhat below par, were none the subject of any disease. The diagnosis of anemia, the cessation or diminution in intensity of the murmur upon deep pressure on the jugular (light pressure may serve to increase it), and the absence of corroborative evidences of aortic insufficiency serve to protect from diagnostic errors. Ausculting from the base of the heart toward the jugular vein one can satisfy oneself that this diastolic murmur gradually merges into a rhythmic diastolic augmentation of the continuous venous hum of the jugular. Otherwise the occurrence of an inorganic diastolic murmur is practically unknown, and the detection of such a murmur argues with the greatest probability in favor of an organic lesion.

But again, an aortic incompetency very frequently exists without there being present any diastolic murmur capable of detection. Especially is this true of the greater degrees of incompetency. Under such circumstances we have recourse to the other signs of aortic insufficiency, and the character of the pulse is such a positive indication of the condition as to often almost permit us to make the diagnosis from it alone. And it is precisely in such cases that errors are liable to occur. Between eighty and ninety per cent. of all cases of aortic incompetency are accompanied by an aortic systolic murmur without there being present any stenosis of the orifice whatever. In other words, a systolic murmur at the aortic cartilage does not indicate stenosis of the aortic orifice; such a condition being among the rarest of cardiac valvular lesions. But frequently in aortic incompetency the only murmur audible is an aortic systolic one, the second sound being absent, or almost so; or it may be feebly preserved. Under such circumstances, there being present the other physical signs of an aortic insufficiency, such an aortic systolic murmur may be made use of to supplement the diagnosis of an aortic incompetency. The genesis of this aortic systolic murmer, there being absolutely no stenosis of the aortic orifice present, has been explained upon the supposition of: (1) A great increase in the rapidity

[1] Lancet, February 29, 1896.

of the expulsion of an excessive quantity of blood, and a consequent excessive distension of the aorta during the ventricular systole, whereby ensue irregular movements of the walls of the aorta, which are causative of the murmur; (2) a sudden and violent meeting of the systolic stream of blood with the regurgitating stream; (3) roughness and irregularities of the aortic valves, dependent upon endocarditis or atheroma, and against which the blood impinges during systole.

An aortic stenosis is, however, characterized by the occurrence of a systolic murmur transmitted into the carotids, but with its point of maximum intensity at the aortic cartilage. The murmur alone, however, is not diagnostic of the lesion. I do not need to again review in detail the various conditions to which a systolic murmur at the base of the heart may owe its origin. The justification of the diagnosis of a stenosis of the aortic orifice is found in the demonstration of the physical signs of the physical conditions dependent upon the lesion. And particularly must I mention the "*pulsus tardus.*" We also take into consideration the other physical evidences of the lesion, not forgetting the importance of negative signs, or signs indicative of another lesion. We must bear in mind that we very frequently also hear an aortic diastolic murmur dependent upon an aortic insufficiency, with which, in fact, the majority of cases of aortic stenosis are complicated.

Of not less importance, in considering lesions at the aortic orifice, is determining the presence or absence of an aortic aneurism, which, if present, may give rise to a systolic, a diastolic, or a double murmur. But the signs and symptoms pertaining to anurism on the one hand, and to aortic disease on the other, guard against error. Of course, aortic disease and an anurism may coexist.

While by reason of their much less frequency of occurrence, valvular lesions of the right side of the heart are less liable to lead to diagnostic errors than are those of the left, still, as they do occur, it behooves us to make no mistakes. Clinically, the most important right sided lesion is a tricuspid insufficiency, which is usually relative, and secondary to some disease of the left side of the heart, most frequently at the mitral orifice.

And once again, a murmur-systolic, at the lower end of the sterum, is not diagnostic of the condition. It is usually difficult to distinguish this murmur from one produced at the mitral orifice, and which frequently accompanies it. We have more regard for the area of cardiac dulness, the non-accentuation of the previously accentu-

ated second pulmonic sound, the result of an examination of the veins, etc. The veins show pulsations, presystolic-systolic in time, especially affecting the jugular, though they may occur in other veins, and are frequently demonstrable in the liver. These venous phenomena have elsewhere been the subject of a more detailed dissertation.[1]

We bring similar aids to assist us in the diagnosis of that much rarer and usually congenital lesion at the tricuspid orifice, stenosis. This lesion is, however, comparatively speaking of such rarity, and almost never exists without an accompanying insufficiency of the tricuspid valves, that its diagnosis is a matter of little practical moment. A diastolic or presystolic murmur would be of value in the diagnosis, as also would an examination of the veins, etc.

The lesions at the pulmonary orifice, almost without exception congenital, present physical signs the counterpart of those which accompany similar lesions at the aortic orifice. Stenosis of the pulmonary opening is of more frequent occurrence than incompetency of the pulmonary valves. It is, however, hoped that at this day no one will mistake the accidental hemic murmur, or the murmur of mitral insufficiency at times heard at the pulmonary cartilage, for an indication of pulmonary stenosis.

Of necessity, because of the complexity of the conditions, it is in cases of combined valvular lesions that more difficulty will be experienced in making the correct diagnosis. But in such cases similarly as in cases of single lesions, the diagnosis is to be based upon the demonstration of the physical signs of the pathologically changed physical condition of the heart. Of those signs the murmur, or murmurs, present, constitute a part. The detection of a murmur and the localization of it to its seat of origin, are essential elements in the diagnosis, but alone they do not justify the diagnosis. It is true that in very few conditions, save those of valvular lesions, do we meet with multiple murmurs, but it is equally true that conditions which give rise to the production of single exocardial murmurs may exist in combination. The systolic hemic murmur of anemia at the base, and the diastolic murmur transmitted from the veins may be confused with the murmur of double aortic disease. Disease of the mitral or aortic valves may coexist with pericarditis. In estimating the probability of multiple lesions we must always take into consideration the preponderance of signs suggestive

[1] *New York Medical Journal*, January 18 and 25, 1896.

of individual lesions, as the signs of one lesion are necessarily modified by the development or presence of another. Illustrative thereof I may cite the

CASE of a man, aged about twenty-eight years. He had a bulging precordium, a heaving cardiac impulse, a diffuse apex beat with maximum intensity in the sixth interspace, one inch outside of the mammillary line, a presystolic thrill at the apex, great increase in the area of the cardiac dulness transversely (to the right and left), and in the direction of the long axis of the heart. On auscultation at the apex, in addition to a fairly well preserved, rather valvular-like first sound, there was a systolic murmur and a reduplication of the second sound. At the aortic cartilage, there was a systolic murmur quite different in character from that heard at the apex; the second pulmonic sound was accentuated, but at the base there was no reduplication of the second sound. The pulse, while not excessive in volume, was distinctly the *pulsus celer et altus*, the Corrigan pulse. The diagnosis was made of mitral insufficiency and stenosis and aortic insufficiency. The area of cardiac dulness indicated hypertrophy and dilatation of both sides of the heart, aortic and mitral disease. The mitral insufficiency was further indicated by the systolic murmur, the mitral stenosis by the valvular rather accentuated first sound at the apex (the other lesions should have diminished its intensity), the reduplicated second sound at the apex, and the presystolic thrill, the presence of both lesions being further confirmed by the accentuated second pulmonic sound. The aortic incompetency was indicated by the area of cardiac dulness, the character of the apex beat, and the Corrigan pulse, somewhat modified in character by the concomitant mitral disease. The systolic murmur at the aortic cartilage indicated simply disease at the aortic orifice, and not stenosis, as there was no corroborative evidence of such a lesion. The necropsy confirmed the diagnosis.

Multiplication of instances is useless.

As we are at present dealing not so much with the diagnosis of valvular lesions as with the significance of murmurs in their diagnosis, we cannot consider more in detail these interesting conditions, nor can we take up at all the study of various anomalous states inducing murmurs, such as patulous foramen ovale, defect of the interventricular septum, persistence of the ductus arteriosus, or various anomalous and pathological conditions of the chordæ tendineæ, or intraventricular bands. These latter may sometimes produce systolic murmurs, simulating mitral incompetency.

It will be noticed that I have not qualified the murmurs except by the time of their occurrence. It is not the character of a murmur, nor its area

of distribution or propogation, nor its direction of transmission that determines it value in the diagnosis of valvular disease of the heart. All of these are subordinate to the time of its occurrence and the site of its production.

There is a certain analogy existing between the significance of murmurs in the diagnosis of valvular disease of the heart, and the detection of albumin in the urine in the diagnosis of nephritis. As murmurs are usually present in cases of cardiac valvular disease, so also is albumin present in the urine in the event of nephritis, but neither is pathognomonic of the condition which they attend; they both require confirmatory evidence. The analogy can be carried still further. As some cases of valvular disease may be diagnosticated without the detection of a murmur, so may we also diagnosticate nephritis in certain rather unusual instances when we fail to detect any albumin in the urine. In some interstitial cirrhotic conditions of the kidney, the specific gravity, the daily quantity of the urine, casts, etc., and the consecutive changes in the heart and circulatory apparatus are sufficient evidence upon which to base the diagnosis of nephritis although albumin be absent from the urine.

I have attempted while endeavoring not to underestimate the value of murmurs in the diagnosis of valvular disease of the heart, to suggest that they are often overestimated, and to point out that they are never of pathognomonic significance. I have endeavored to draw more attention than is usually accorded to the other and important physical signs of valvular disease of the heart. It is the other physical evidences of the necessary changes consecutive to the valvular defect that form the justification of the diagnosis. The murmur is but one element in the diagnosis, and I would almost say the least important.

CLINICAL MEMORANDA.

CASE OF TRAUMATIC TETANUS SUCCESSFULLY TREATED WITH VERATRUM VIRIDE AND GELSEMIUM.

BY FORDYCE GRINNELL, M.D.,
OF PASADENA, CAL.

GUY B., a boy, aged six, while playing in his yard, barefoot, cut the ball of his left foot on a piece of glass. The wound apparently healed. Some nine days after (April 14th), he complained of stiff jaws and difficulty in swallowing. These symptoms increased until, on the night of the 16th, tetanic spasms began to manifest themselves. The cicatrix of the wound was cleaned and scraped. It seemed somewhat tender on pressure, but no foreign body was discovered. The site was scarified,

however, and turpentine and oil applied, and four-grain doses of ammonium bromid were given every two hours.

As no perceptible improvement was noted, on the 17th Norwood's tincture of veratrum viride was given, at first one drop every hour, then two drops every hour. As this did not seem to prevent the return of the spasms from time to time, fluid extract of gelsemium was given, at first in drop doses every hour, in conjunction with the veratrum, then in two-drop doses, and finally in three-drop doses. The veratrum was also increased on the 20th to three drops every hour, so that the child was taking three drops each of the veratrum viride and the gelsemium every hour, and it seemed to require this amount to control the spasms. This dosage was continued for forty-eight hours. Only once during this time did it produce active vomiting, or sufficient nausea to require an opiate to control it. When this relaxed condition was obtained, the drops were decreased to two of each on the 22d, and on the 25th to one of each, which was continued until the 27th, when the interval was lengthened to two hours, and gradually thereafter discontinued.

The ammonium bromid was given in three- to four-grain doses every two hours during this entire period.

The remedies in diminished doses were continued to the 30th of April, when the boy could open his mouth without difficulty, had a good appetite, was playful, but more boisterous in his manner than usual, or, as his mother said, "more nervous."

The remarkable thing to me was the tolerance in one so young of such powerful remedies and in such doses. It seemed to require these doses to control the conditions producing the tetanic spasms. The instructions were to decrease the amount and frequency of dose when distinct signs of nausea appeared or the signs of convulsions abated.

I had been led to think that veratrum viride might prove a valuable remedy in traumatic tetanus, as it had done in puerperal and other convulsions, and that gelsemium, in its peculiar action in causing relaxation of the muscles of the jaw, might prove a valuable adjunct, and in this case these remedies did not disappoint.

COMPOUND FRACTURES.[1]

BY W. T. DODGE, M.D.,
OF BIG RAPIDS, MICH.;
SURGEON TO MERCY HOSPITAL.

THE tendency has been manifested during the past few years among many of our friends who are connected with railroads to report all classes of injuries received on the rail under the general heading of "Railroad Surgery." While I have never been connected in any capacity with a railroad, I have nevertheless had much experience during the last six years in this branch of surgery. During that time more than seven hundred cases of injury have been admitted into Mercy Hospital at Big Rapids, and with the treatment of all of them I have had more or less to do. While these cases of injury have ranged all the way from insignificant bruises to severe crushing of the limbs and trunk resulting in death a few hours after admission,

[1] Read before the Michigan State Medical Society, June 4, 1896.

the majority have been cases of bruising or crushing of the legs with or without broken bones of all grades of severity. These injuries have been caused generally by the limbs having been caught between two logs, or in some accident on one of the various logging railways of Northern Michigan. I have been unable to recognize any difference in the pathological conditions in a leg crushed between two logs and one crushed between two car-couplers, and I think the term "Railroad Surgery" is not properly applied to this class of injury.

A compound fracture may vary in severity from a small puncture in the skin leading down to an ordinary fracture to a severe crushing of the soft parts with much comminution of the bones. In the less severe injuries the indications for treatment are very plain, and at the present day are usually well carried out by all practitioners. They are to clean the injured limb in the surgical sense, apply dressings that will seal the wound, and keep the bones in proper position and at rest. Careful watch should be kept of the case, and if, in spite of the aseptic precautions, suppuration ensues, free incisions should at once be made, and antiseptic measures adopted. It is in the more severe class of injuries, however, that the surgeon's judgment is put to the test, and if he attempts to save the limb the patience and perseverance will be severely tried. When called to attend a broken limb associated with extensive crushing and laceration of the soft parts, the first question to decide is whether an amputation shall be done at once, or whether an attempt will be made to save the injured member. I believe that in nearly all cases except in those in which the tissues are ground to a pulp, amputation should not be immediately performed, but that the patient should be given the benefit of delay. In the apparently hopeless cases the injured limb and surroundings should be cleaned as thoroughly as possible without increasing the traumatism, surrounded with warm antiseptic dressings, and kept at rest without attempting to place the broken bones in apposition until the inflammatory reaction following the injury has subsided. Should general gangrene of the limb ensue amputation should be performed, but if the gangrenous process is localized I should not consider it an indication for amputation even if considerable tissue is destroyed and extensive necrosis of the bone occurs. Patience, perseverance, and a thorough, painstaking application of the principles of antiseptic surgery may result in saving the limb. As soon as the inflammatory reaction has subsided the dead tissue should be removed, necrosed ends of the bones sawed off, the limb brought into a good position and maintained there in a swing, or by means of any simple retention apparatus that will permit the use of gauze dressings and irrigation of the limb.

The celebrated case of Dr. Donald Maclean reported by him in a paper read before the Ohio State Medical Society in 1894, and in this Society by Dr. Tibbals last year, is one of the most wonderful cases on record in this class of injuries. The report of that case inspired me to successfully attempt the saving of limbs that before I should have amputated, and has also induced me to again call your attention to this important subject.

Without further preliminary I will now submit the report of a few cases that will illustrate the method of treatment advocated.

CASE I.—J. M., a Swede, who was admitted to Mercy Hospital, June 22, 1892, had had both legs fractured below knees the day before in an accident on the railway. The right leg sustained a simple fracture, which united in a short time. The left one, however, was caught between two logs and severely bruised, the skin being broken over a fracture at the middle third. We thoroughly cleaned the leg, placed the bones in apposition, and sutured the soft parts which healed by first intention. At the end of a month there was non-union of the tibia. A plaster dressing was then applied and the patient encouraged to move around, but after several weeks the bones were still ununited. An incision was then made over the point of fracture which was found to be very oblique, extending three inches in length of the shaft of the bone. Much fibrous tissue separating the fragments was removed and the bones fastened together with bone nails. A plaster dressing was applied and allowed to remain one week. During this time the patient felt well, had a good appetite, slept well nights, and was free from pain and fever. These favorable symptoms were considered conclusive evidence that all was well at the seat of the operation. Nevertheless, at the end of one week the patient had a severe rigor, whereupon the splint was removed and the wound found to be full of pus, and the entire leg and foot the seat of a violent erysipelatous inflammation. Free incisions were made and the disease in the leg soon brought under control, so much so that the fractured bones united without further difficulty. Not so with the foot. Necrosis of the tarsal bones supervened, necessitating several operations for the removal of dead bone. Eventually, after eight months' treatment the foot became sound and the patient began walking around with the assistance of a cane. He continued doing this several weeks when suppuration again occurred in the foot and rapid destruction of the bone ensued. By this time the patience of all concerned had been exhausted, the patient was very anxious to return to Sweden and begged for amputation. The confidence of the doctors in the powers of Nature to restore the lost bone was shaken, and the foot was amputated at a point about three inches above the ankle below the original fracture of the tibia. The stump healed kindly.

CASE II.—O. M. was admitted to the Hospital January 6, 1893, his leg having been caught between two logs, the soft parts badly crushed and lacerated, and a compound, comminuted fracture of the tibia and fibula sustained. We removed the loose fragments of bone, cleaned and crushed tissues thoroughly, and placed the broken bones in apposition. Suppuration supervened in a few days, and the patient decided to have the leg amputated, after the chances of saving it had been duly presented. This was accordingly done, and he was discharged February 20th. A little more courage on the part of the patient, and perseverance on the part of the surgeons would probably have preserved this leg.

CASE III.—L. O., a Swede, was admitted to Mercy Hospital, October 26, 1894. Eight weeks previous a compound fracture of the right leg had been sustained, and the soft parts had been much bruised and lacerated. The skin had been destroyed over a considerable area, and there were two granulating patches about the size of silver dollars when he was admitted to the Hospital. The deep tissues had healed, however, and the bone appeared to be partially united, only a slight degree of mobility being present. I encouraged the patient to walk, thinking that exercise would stimulate union. Instead the mobility increased and soon a loose fragment of bone could be detected on the anterior surface of the leg, which slipped out easily through a small incision. We then irritated the fractured tibia by driving a drill several times into the fragments and rubbing the ends together, although they were so firmly attached to each other as to permit but limited movement. The position of the limb being good and partial union having apparently occurred, the small incision was closed and the leg placed in plaster-of-Paris. The wound healed by first intention, but in four weeks the bone was found more movable than before, and the position of the fragments not so good. A free incision was then made over the broken bone, when it was discovered that the fracture had been an impacted one. The sharp posterior point of the lower fragment had been forced upward under the periosteum of the upper fragment, the detached piece previously removed having filled up the depression in the anterior surface of the limb very nicely, and thus conveyed the impression that the bones were in perfect apposition. So firmly were the fragments impacted that we found it impossible to separate them until the end of the lower fragment had been divided with the chain saw. The bones were then brought into apposition and wired. The skin was carefully sewed and antiseptic dressings applied. We had been having trouble with erysipelas in the Hospital about that time, and, although a thorough cleaning had been gone through with immediately before this operation, in a few days the patient's entire leg became the seat of a violent erysipelatous inflammation. The suppuration thus produced gave us work for many months, necessitating on two occasions the removal of dead bone from the leg. Eventually the necrotic process was arrested and the bone became firmly united. He was discharged about six months after admission.

CASE IV.—W. P. This patient had his left foot caught between two car-couplers September 1, 1894, and Dr. W. A. Kuhn of White Cloud, Mich., found the foot crushed and the lower third of the leg severely bruised, but could detect no broken bones and therefore concluded to attempt to save the leg. He made use of warm antiseptic applications but failed to restore the vitality of the injured member, and called me in consultation nine days after the injury. I found the foot gangrenous and the lower third of the leg much discolored, in fact, the discoloration extended nearly to the knee. There was, of course, nothing to do but amputate. The tissues were edematous and discolored nearly to the knee, but a line of demarcation had formed just above the ankle, and I concluded to risk something by amputating at a point two inches above the line of demarcation and through the discolored tissues,

rather than take the other alternative of a knee-joint amputation. The flaps soon became gangrenous, however, and left the bone uncovered, and twenty days after the amputation I was called upon to remove the projecting bone. The gangrenous flesh had separated and the soft parts were then covered with granulations. I removed the bone and expected that the stump would heal rapidly by granulation. I was again disappointed, however, as the soft parts again retracted, leaving the bone exposed, and on November 1st the patient was brought to Mercy Hospital, where I made a reamputation at the beginning of the upper third. He then did nicely and was soon discharged with a sound stump. An examination of the amputated foot disclosed the fact that not a single bone was broken. This was a remarkable fact when it is considered that the soft parts were literally crushed to a jelly and their vitality entirely destroyed. While this case is not one of a compound fracture I have included it in this paper because the injury was of essentially the same nature, and involved the same considerations as would a fracture case.

CASE V.—A. B. was admitted to Mercy Hospital January 22, 1895, having been brought sixteen miles in a sleigh on an exceedingly cold night. His left leg had been caught between two logs and a compound, comminuted fracture of the tibia and fibula sustained. The first metatarsal bone had also been fractured, and a portion of the bone was torn from its attachments, forced through the skin, stocking and boot, and thrown a distance of several feet from the foot. I saw him a half hour after his reception at the Hospital, when he was nearly dead from cold and loss of blood. The leg had been tightly constricted for several hours and was black and cold, especially over the top of the foot. A fragment of the tibia I found upon the leg at some distance from the wound, and, as I have stated, the greater portion of the first metatarsal bone was missing altogether. At that time I had no thought of saving the leg, but, as the patient was in no condition for an operation, I directed that stimulants be given him and that his leg be surrounded with hot water bottles. I also had the leg irrigated and covered with bichlorid gauze, but made no attempt to place the bones in apposition. The following morning the foot was still cold, black, and swollen, and his general condition was very bad. I made a number of punctures in the dorsal surface of the foot from which exuded colorless serum in large quantities. During the day his general condition improved and arrangements were made to amputate the leg on the morning of the 24th. Other physicians were invited to be present at the amputation, and all our arrangements had been made for that procedure, when I found that much of the discoloration had disappeared from the foot, that it was warm and would bleed when pricked. With the concurrence of my colleague, Dr. Burkart, I concluded to defer the amputation. I wish to say that none of us would have thought of attempting to save this limb had it not been for the encouragement received from the report of Dr. Maclean's case, and this man owes a very good leg to the fact that the doctor reported that case so promptly. We followed Dr. Maclean's advice and made no attempt to reduce the

fracture or do anything at all with the leg until the inflammatory reaction had subsided. Then with the chain-saw we removed the splintered ends of the tibia and wired the fragments together. Subsequent events demonstrated that we should at the same time have amputated the large toe, which had lost its metatarsal bone, but acting on the theory of doing as little as possible, we left the toe and packed the cavity from which the metatarsal bone had been extruded with iodoform gauze. All went well for several weeks and the fractured tibia united very nicely. A large piece of skin sloughed off from the sole of the foot and the back of the heel, but the resulting ulcers healed nicely by granulation. Then suppuration commenced in the tissues of the foot, quickly followed by necrosis of the metatarsal bones. We made free openings, used the curette freely, and eventually removed all of the metatarsal bones. Fortunately, the destructive process became arrested at this point, the foot filled in and in time became entirely sound. The toes dropped back to some extent owing to the loss of the metatarsals, and when healed the foot was shorter than the other, but he had motion at the ankle, a firm foot, fully as useful for the purpose of locomotion as the other one. His leg was two inches shorter than before, but by the use of a high-heeled shoe he is able to walk very nicely without a cane. He was discharged from the Hospital July 23, 1895, six months after admission.

CASE VI.—C. S. was admitted to Mercy Hospital, April 10, 1895. He had sustained a fracture of the right femur eight weeks before, which had been put up in the usual manner with Buck's Extension Apparatus by the attending surgeon, Dr. Foster of East Jordan, Mich. Union failed to occur and after eight weeks the patient came to Big Rapids, thoroughly dissatisfied with his doctor and determined on a malpractice suit as soon as he recovered. I found a fracture in the lower third of the thigh with no union whatever, and made an incision on the outer side of the leg over the seat of the fracture. The bone had been broken in the course of attachment of the adductor magnus, and a large band of muscular tissue had been drawn between the fragments holding them apart, so that I found it impossible to bring them together without dividing the muscular band. When this had been done the fragments were exposed, the end of each cut off, and the freshened surfaces securely wired together. A spiral drainage-tube was introduced and the plaster-of-Paris dressing applied, a window being left for the exit of the drainage-tube. All went well for the first week; bloody oozing stopped, and the tube was removed. Subsequently localized suppuration occurred, necessitating the reintroduction of the tube. Under antiseptic irrigation the suppuration soon subsided, and the incision quickly healed. The bone united after some delay, and in two months the patient was discharged. Before his departure I convinced him that his doctor was not in the least to be blamed for the failure of the bone to unite, and thus averted the threatened suit. Dr. Foster wrote me recently that the patient had a good leg and was only troubled by a stiff knee, which resulted from the long confinement in a straight position. He declined to have anything done for this condition before leaving the Hospital.

CASE VII.—J. M. was injured about two o'clock in the morning October 8, 1895, by being caught in a belt. His right leg was drawn partially around a pulley, and fractured in the lower third. I saw him a half hour later in a most dirty habitation, and the boy himself was in about as filthy a condition as one can imagine, with six inches of the tibia denuded of its periosteum projecting through a hole in an exceedingly dirty trouser leg. Upon removing the trousers I discovered that a flap of skin had been torn loose from the anterior and inner sides of the leg. The apex of the flap was two inches above the inner maleolus and the base two inches below the knee. The base was attached, the flap having been made by the upper fragment of the tibia. As the leg had been drawn around the wheel, the bone had given away, and the upper fragment had torn through the soft parts, producing the large V-shaped flap described. The fracture in the tibia was a very oblique one extending through a space of three inches in the shaft of the bone. The fibula was, of course, fractured, but was not exposed to view. I requested the people to move the boy to the Hospital and met with a refusal. I then informed them that I should not attempt to save the leg in that house, that the surroundings were so dirty that no good results could be expected, and that they must take their choice of an immediate amputation or a removal to the Hospital, where I would attempt to save the leg, but that I was by no means certain of achieving that desirable result. The alternative quickly brought the family to their senses, and the patient was transferred to the operating-room at the Hospital; where we turned the hose on the patient and gave him such a cleansing as he had evidently never before had. The broken tibia was then brought in position, and secured by a silver wire suture passed transversely through the oblique fracture. Ragged fragments of tissue were removed and the V-shaped flap carefully sewed in position. Large gauze dressings were then applied and the leg placed on a posterior felt splint. The tissues had been so much bruised and lacerated that during the following week enormous quantities of bloody serum exuded from the leg. In a few days the silver wire suture became broken and was removed but no displacement of the bone occurred. A half inch margin of the V-shaped flap sloughed off. The remainder became united, and the space left by the sloughing tissue quickly filled in by granulation. At no time was there any evidence of suppuration. In six weeks the entire wound exsepting the small point at the apex of the flap had firmly healed. At the apex the tip of the upper fragment of the bone was exposed, and did not cover with granulations. As the bone itself had united and as there was no suppuration, I determined to let Nature take her course for a time and permitted the boy to move around on crutches. On January 1, 1896, the bone having become firmly united, the patient left the Hospital and came to my office occasionally to have the leg dressed. A month later a thin shell of bone separated from the inner surface of the tibia, and I removed it with forceps. After that the small wound rapidly closed by granulation, and the boy was dismissed from observation about March 1st.

These cases have been selected as illustrating the im-

proved results that may be expected from increased experience. They cover the period of my connection with Mercy Hospital and present, I hope, some evidence of professional advancement during the past six years. In cases V and VII, who to-day have good legs, I should certainly have amputated so recently as two years ago without a thought that there was the slightest probability of saving the limbs. I trust that these reports may encourage others to perseverance in the same direction when similar injuries are encountered.

MEDICAL PROGRESS.

Vibrations and Fatigue in Bicycle Riding. — TURNER reports in the *British Medical Journal* for May 16, 1896, the conclusions from a large number of experiments made in order to determine the effect of vibrations upon the body. The symptoms which usually follow a hard bicycle ride and which used to be attributed to vibration are sleeplessness, thirst, want of appetite, followed by lassitude, headache, and in severe cases, palpitation of the heart and great depression. No such symptoms are complained of by engineers nor firemen, nor were experienced by Turner after a one hundred mile ride on the front of an engine, though the vibration in that situation was much greater than occurs on any bicycle. A comparison of the excreta after hard rides with pneumatic and solid tired bicycles showed that the body waste was from ten to twenty per cent. greater with the latter, the exact amount varying according to the conditions of road and weather, and due evidently to the excess of power which was necessary to propel the solid-tired wheel, and not to excessive vibration. To make this quite certain, Turner rode twenty-five miles on a perfectly smooth track on a tricycle, shod with two-inch pneumatic tires, and an easy spring and large saddle. Vibration was at a minimum. A high wind was blowing, and as he was not in training and rode about eighteen miles an hour, he finished quite exhausted. He suffered from every symptom supposed to be due to vibration, and that night had a temperature of 102.6°. All unpleasant symptoms subsided after forty-eight hours' rest. The lesson is obvious, that, although vibration has been greatly lessened by the pneumatic tire, the danger from over-fatigue is the same as ever.

A Fetus in the Abdomen of a Man.—A remarkable case was presented before the Academy of Medicine (Paris) by LÉVY (*La Semaine Méd.*, May 6, 1896). A young man, aged nineteen, suffered for two years with an abdominal tumor. At operation, this tumor, which had grown to the size of a child's head, was found to be situated retroperitoneally between the mesenteric reduplications. It contained a yellow gelatinous fluid, and a female fetus of about the fifth month of development. The patient died twenty-four hours after operation.

The tumor was evidently to be classed among the dermoids, and was really a rudimentary twin, which after a long period of inactivity had resumed its development, and the fetus was therefore the sister and not the daughter of the patient.

THE MEDICAL NEWS.

A WEEKLY JOURNAL

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THE "DRINK CURE" IN BELLEVUE HOSPITAL.

IN a previous issue we called attention to the fact that the Commissioners of Charities in this city had set apart a ward in Bellevue Hospital for the trial of a secret " cure " for drunkenness, and that the experiment was to be carried out under the immediate surveillance of the proprietor of the remedy.

The experiment has now been completed, a fulsome report has been forwarded to the Commissioners, and the daily press has prematurely heralded throughout the country the miraculous results which have been obtained by the use of Dr. Oppenheimer's cure.

The affront and indignity offered to the physicians of Bellevue Hospital and to the profession at large by this action of the Commissioners is unprecedented in the history of their office, or in the annals of Bellevue Hospital, and it is proper to make inquiry as to the cause which led to such an action. We can do so most effectively by recounting the evolutions of the "cure." A

few years ago the proprietor, who was a physician in good standing, circulated among the profession a printed communication in which he set forth that he had been unusually successful in the treatment of alcoholism, and that he would be glad to take charge of such patients, for physicians, at his house which he had converted into a sanitarium. The fact that a stock company had been organized for the treatment of inebriety by a secret measure was not mentioned. It was not until attempts were undertaken to dispose of the rights to utilize the substance in European territory, and a reorganization of the company and redistribution of the stock was made that the unwholesome aspects of the scheme came to light. That our readers may know the full scope of the undertaking and the character of the men who are advancing this enterprise, we publish in another column a nearly complete copy of the charter of the company.

That the project might have a show of respectability the names of five reputable physicians were given, who, it was said, had consented to become consultants to the Sanitarium. It came to light, however, that some of them had accepted a financial interest in the company without returning a monetary *quid pro quo*. Further gifts of stock were made among the profession and elsewhere, and so advantageously placed was this generosity that the road to his honor, the Mayor, was made easy. The motives which prompted the Mayor to urge the Commissioners, against the better judgment of the minority of that Board, to establish an unprecedented, unwarranted and unjustifiable foothold for the use of secret preparations in the hospitals under their jurisdiction can only be surmised.

The counsel of those best qualified by years of training and experience as to the advisability of such a revolutionary procedure was not sought, nor was it politely received when given unasked.

Despite the opposition of the entire Medical Board, in the face of the personal appeals of unbiased and tolerant individuals capable of clearly seeing the outcome of such a procedure, the Commissioners set apart a ward for the experimental use of a substance, the constitution of which was known to its proprietor alone. Examples of favoritism have not been wanting in previous adminis-

trations, but none surely that can in any way approach this.

A few days of trial of the politically fostered "cure" has convinced the "Experimenting Board of Commissioners" that "there is something in it." A second Keeley cure, forsooth! It has likewise convinced others that "there is something in it," viz : shares of the stock of a company which, by reason of the boom to be given by its introduction into Bellevue, promises good dividends.

At the present time the office-room of the Charity Commissioners is like the sanctum of a popular patent medicine proprietor, testimonials from grateful patients "cured," abound; while the individual member of the Commission, who has taken such a suspiciously personal interest in the experiment, is busying himself visiting "cured" cases and verifying testimonials, labor for which the Commonwealth pays him $5000 a year. The New York daily press, in the meantime, is publishing affidavits of men who have been through the "cure" and pronounce it entirely worthless.

In the future we may expect Bellevue Hospital to be made the arena where any individual with a "cure" for consumption, or the tobacco habit, or inebriety, or even for the unsavory big "G," if a reporter, an editor, and a few physicians be properly subsidized, can demonstrate that "there is something in it,"—a possession equal to a scientific corrollary for the present Commissioners. We hereby call the attention of any one in possession of such a "cure," and likewise any one who can think of a cure before the present Commission expires, that there is in New York City a magnificiently equipped hospital, with an unexcelled visiting and house staff, which is at their disposal, and which they can have for the asking, according to the precedent just established.

PRECAUTIONS IN THE PROPHYLACTIC USE OF THE ANTITOXIN OF DIPHTHERIA.

ADAMKIEWICZ, in the *Wiener med. Presse* for May 3d, attempts an explanation of the cause of death, or alarming symptoms, subsequent to injections of *heil-serum* for the preventive treatment of the healthy. He first considers the argument brought forward by Langerhaus of Berlin, who recently had a fatal case of this nature in his own

family. The latter attributed the death to the poisonous action of the antitoxin upon a healthy subject when unneutralized by a preëxistent toxin. This seems *a priori* improbable considering the large number of cases of suspected diphtheria which have been treated by antitoxin without ill-effects, and in which the suspicion has been proved unfounded. Nor does the evidence show that the injection of serum into a vein is in all cases *per se* an element of danger, since the blood is able to tolerate the introduction of considerable quantities of indifferent substances with impunity. That the fatality was due to the amount of carbolic acid in the injection is not in accordance with the known effects of that substance, and the death was far too sudden to have resulted from poisoning by the serum itself, serum intoxication having been shown by Eulenburg to be always a more or less chronic process.

The entrance of the serum into a vein and its employment in too concentrated a form having also been excluded, one is compelled to seek another cause for the intensification of its action in this case. This Adamkiewicz finds in a disturbance of the adaptive mechanism of the organism. The living body is provided with a self-regulating apparatus which protects it against noxious influences within certain limits; once these are passed the animal is lost. In his recent experiments with "cancroin" he found that several patients showed without apparent reason alarming signs of collapse after injection; and by careful exclusion was forced to conclude that the cause was sudden passage beyond the bounds of the regulating mechanism. This was confirmed by the discovery that no such effects resulted when the injection was gradually given so as to allow the organism time for adaptation; in consequence of this Adamkiewicz now injects "cancroin" in tenths of a cubic centimeter, allowing some seconds after each injection for the self-regulating mechanism to act.

He further extended his experiments to the injection of atmospheric air into the veins of a guinea-pig, and found that a considerable quantity could be taken up and eliminated without danger if it were given in small doses; thus 10 c.cm. injected in this way produced no ill-effects, while 2 c.cm. were instantly fatal when injected at

once and forcibly. Any substance, serum included, may have a double noxious action when introduced into the body, proportional to, first, the force with which it is injected, and secondly, the specificity with which it acts on the blood or through the blood on other constituents of the body. The virulence increases with the force of injection, and this may well account for the death under consideration.

RESUME OF RECENT PROGRESS IN ORTHO-PEDICS.

THE OUTGROWING OF DEFORMITY.

THE closer search for first causes, which has been stimulated by the development of orthopedic surgery in the direction of prevention, as well as toward a broader and more effective treatment of deformity, has made it, more than ever before, evident that a large proportion of the disabilities of later life have their origin in early childhood; and many deformities which, in the sense of perfect cure, are hopeless when advice is asked, belong to the class that is popularly supposed to become outgrown. In estimating the value of the evidence that supports this belief, one must bear in mind the fact that the popular standard of symmetry is a low one, and that minor disabilities receive no consideration whatever. One need not look farther than the foot for an example to support this statement, for the accepted type of beauty of this useful member, at least, when it is concealed by the shoe, is one of deformity and evident disability.

If one asks the reason for an individual faith in the outgrowth of deformity, he will usually find it rests upon the fact that bowed legs become straight or straighter as they increase in length; and it is because of this proof of the corrective power of nature that a mother has expected it may be, to see the slowly increasing hump of Pott's disease finally disappear! That bowed legs, even, are not always outgrown, is easily demonstrated by observation on the streets of the city; and it is certain also that if the deformity is less marked in the adult than in the child, the moral discomfort produced by it is correspondingly greater.

However strong may be one's faith in the outgrowth of deformity, he will admit, doubtless, that a straight child is more likely to become a straight man than a crooked child, and that correction may be more effectively applied at an early than at a later period. The growing child has often been compared to the growing plant or tree that may be trained toward symmetry, or that, by neglect or accident, may become inclined toward deformity. Trees and children have the same inherent force that tends to overcome deformity, but those who wish to produce straight trees watch for the beginning of distortion, and if it may not be quickly corrected, the tree is rooted out and replaced. Children thus differ from trees, in that they are neither selected, nor can they be replaced by more promising specimens, and it would seem, therefore, that all the more care and vigilance should be exerted in preventing deformity, or in correcting it in the early stages of its development.

If, then, one is to trust in this power of nature to overcome deformity, he should have a clear apprehension of the reasons for his faith, that he may compare intelligently the probability of its realization with the danger of the neglect of timely treatment.

In the popular mind, the seriousness of deformity depends entirely upon its noticability; from this point of view, the question of outgrowth depends upon its relative proportion to the body. If it remains stationary, it will become less marked as the body increases in size, until it may finally disappear. But deformity is not, as is popularly supposed, an entity; it proceeds from many causes, and it may be divided, therefore, into many classes; but for the present purpose, two will suffice: One in which outgrowth is impossible, and another in which it is possible or probable under favorable circumstances. In the first class may be placed the congenital distortions and those which are the result of permanent injury, as from paralysis or bone or joint disease. In the second class may be included the bowed legs, the knock-knees, the weak feet, the loose joints, the round backs, the flat chests, and the like. These are often called postural deformities, because whatever may have been the first impulse toward distortion, its development is due to the influence of the force of gravity, which, in man, is more difficult to withstand, because of the upright posture which he alone assumes. This influence will be

more marked if the structure of the body is inadequate to the strain of normal use, either because of an inherited deficiency of vital energy, or because of acquired weakness, of which rachitis furnishes a familiar example. This deforming influence will be increased if the body is subjected constantly to its effects, as by the necessity for fixed attitudes to the point of fatigue in place of the constant change normal in childhood. The tendency to deformity will be favored if improper attitudes are assumed or induced by uncomfortable seats, or less directly by imperfections of eyesight or by habitual occupations in which deforming postures are assumed, influences which often work to the disadvantage of school-children. The outgrowth of deformity of this class will require an accumulation of vital force sufficient not only to withstand the force of gravity, but to draw the weakened and distorted part toward symmetry.

The natural life of the country has long been celebrated as providing the most favorable conditions for the spontaneous cure of weakness and distortion, but such complete reversal of the conditions of life is not always necessary or possible, nor is it always effective. In many instances the body may be inclined toward symmetry by simply avoiding deforming influences, which are not a necessary part of its environment, and by lessening the burdens put upon the weak child until it may be strengthened to withstand them. It is interesting to note in this connection that the term orthopedy, now modernized into orthopedic surgery, was invented by Andry, 150 years ago, to signify the treatment of the more common deformities of childhood by the simple means that might be applied by parents and nurses, and such treatment is still adequate if properly directed and seasonably employed.

The force of nature that tends to the outgrowth of deformity is a blind force, that is much less powerful in the higher than in the lower forms of life. It may be effectively utilized and guided in the face of adverse circumstances, and it may prove impotent when unassisted, even though every condition be favorable. If, then, faith in the inherent power of nature to overcome deformity is to be synonymous with neglect, it may well be replaced by a disbelief that would at least

require favoring conditions for the evolution of individual deformity to symmetry.

ROYAL WHITMAN, M.D.

ECHOES AND NEWS.

Casualities of July 4th.—Two deaths occurred in Brooklyn last week from tetanus. Both were from wounds caused by firing blank cartridges from filthy toy pistols at close range on Independence day.

A New York Hospital Appointment Declined.—Dr. Thomas H. Manley, visiting surgeon to the Harlem Hospital, since it was opened ten years ago, was lately offered a position as consulting surgeon to the same service, but declined.

British Physicians.—Great Britain has on her *Medical Register* 35,000 names. Nearly 10,000 have been added during the past ten years.

A Swindler Arrested.—For several months a number of the New York hospitals have been victimized by a man representing himself as the agent of an express company, and in this capacity he collected excessive bills upon goods that never arrived. On trying this game upon the matron of the New Amsterdam Eye and Ear Hospital, his character was recognized and he was promptly arrested and convicted.

A Statue of Pasteur.—Pasteur's statue is soon to be placed in the market place at Alais, France, to commemorate his discovery of the remedies for diseases of the silkworm. It was at Alais that this work was done by the savant.

Poisonous Extracts.—Owing to the recent death of two children in Philadelphia, attributed to eating "snowballs"—a very cheap variety of water-ice sold on the streets—an analysis was undertaken by Dr. Henry Leffmann. Dr. Leffmann found the extracts used were artificial in some, containing fusel oil and analin dyes, and in others old and dangerously fermented.

Modern Psychology.—Professor Witmer of the University of Pennsylvania, will give during a summer course under the University extension auspices, twenty lectures upon this subject. In these he promises to touch upon such topics as hypnotism, phrenology, and palmistry, and will endeavor to extract any atom of truth that may exist amid the great mass of misconception and nonsensical speculation involved in these falsely called sciences. These are only incidentally treated, the real substance of his course will contain food for the strongest mental digestion.

Obituary.—Dr. Mary Elizabeth Grady of Brooklyn, who received her degree of medicine from the New York Medical College and Hospital in 1884, died at her home, June 29th, from consumption. Miss Grady, who was thirty-three years old, was also graduated from the New York Medical Ophthalmic Hospital College. She practised in Brooklyn, where she was born, and was visiting physician to the Brooklyn Memorial Hospital for Women and Children.

Dr. Samuel Sexton died in New York city, July 11th, aged sixty-three years. He received his medical degree from the University of Louisville in 1856; served during 1861 as surgeon of the Eighth Ohio Volunteers, and since that date has practised his profession in New York City. He was vice-president of the American Society of Otologists in 1886. He was for many years a surgeon of the West Side Eye and Ear Infirmary, and its chief in 1877; and was subsequently a lecturer at the New York Eye and Ear Infirmary. He wrote many articles concerning his specialty, and in 1888 published a work entitled "The Ear and its Diseases." In 1889, he was decorated by Venezuela with the medal of honor, and with admission to the rank of the third class, its highest honor, *el Busto del Libertador*. He was a member of the County Medical Society, the Academy of Medicine, and the Practitioners' Society, and of many clubs. Sexton was ingenious and inventive. He devised some instruments, and adapted an electric lamp for aural examination. He was one of the first American aural surgeons to develop in this country the operation of myringotomy, and operations on the ossicular chain, following Schwartzè, Kessel, Lucæ, and others.

The American Dermatological Association.—The regular annual meeting of this Society will be held at the Hot Springs of Virginia, September 8, 9, and 10, 1896. Everything will be done to make the meeting a success, and several papers on interesting subjects have been already promised. Dr. White will open a general discussion on the subject, "What effect do Diet and Alcohol have upon the Causation and Course of the Eczematous Affections and Psoriasis?" The president, Dr. Charles W. Allen, can be relied upon to organize a most instructive and interesting meeting.

Diet and Disease.—From the report of the New York Institution for the Deaf and Dumb we learn that with an average of 400 pupils annually, aged from 2½ to 18 years, but one death has occurred in nine years among 3600 children; and this death was due to diphtheria contracted while absent from the Institution on vacation. The diet consists principally of beef and mutton, with few vegetables.

The State Board of Health and Street Refuse.—At the meeting of the State Board of Health, on June 30th, there was a discussion concerning the present manner of dumping the refuse of the city in the bay in such a place that it is carried back to the shore by the currents. Power was given to Dr. Smelzer, the secretary of the Board, to coöperate with Supervisor Delehanty of the Navy Department, in the adoption of a new system by which the present conditions will be changed, and the nuisance abated. Dr. Smelzer advocates towing the refuse ten miles beyond Sandy Hook.

Foreign Diplomas.—One of the most commendable features of the new medical law of Ohio is that it fails to recognize all foreign diplomas. The impossibility of discovering fraud and deception, when attempted by those interested in them, renders this step necessary. Besides,

the examination required by the board will prove no hardship to those who really deserve recognition.

Intubation of the Duodenum.—Dr. Hemmeter has been making experiments by which he hopes to enable the surgeon to explore the duodenum by a tube inserted through the mouth. He first causes the patient to swallow a thin rubber bag with a groove along what will be its superior border. This is then inflated and the flexible tube is readily forced along this groove through the pylorus.

The American Public Health Association.—The twenty-fourth annual meeting of this Society will be held at Buffalo, N. Y., September 15–18, 1896. The Executive Committee have selected the following topics for consideration: (1) The Polution of Water Supplies; (2) The Disposal of Garbage and Refuse; (3) Animal Diseases and Animal Food; (4) The Nomenclature of Diseases and Forms of Statistics; (5) Protective Inoculations in Infectious Diseases; (6) National Health Legislation; (7) The Cause and Prevention of Diphtheria; (8) Causes and Prevention of Infant Mortality; (9) Car Sanitation; (10) The Prevention of the Spread of Yellow Fever; (11) Steamship and Steamboat Sanitation; (12) The Transportation and Disposal of the Dead; (13) The Use of Alcoholic Drinks from a Sanitary Standpoint; (14) The Centennial of Vaccination; (15) The Relation of Forestry to Public Health; (16) Transportation of Diseased Tissues by Mail; (17) River Conservancy Boards of Supervision. Upon all the above subjects special committees have been appointed. Papers will be received upon other sanitary and hygienic subjects also.

The Pearl and Rose Leaf.—Mr. Charles James Fox was well acquainted with Dr. Edward Jenner, and would have been well inclined to adopt the good doctor's views except for the fact that he had been prejudiced against the cow-pox by the antagonism of his family physician, Dr. Moseley. One day in playful vein he was bantering Dr. Jenner, and asked: "Pray Dr. Jenner, tell me in regard to the cow-pox, what is it like?" "Why, it is exactly like the section of a pearl on a rose leaf." This comparison, so true and so poetic, quite vanquished the scornful Mr. Fox.

Death After Anti-rabic Inoculation.—A lad of eighteen years was severely bitten on the hand in March, 1895, at Stockport, England, by a large dog that was subsequently proven to be rabid. On the fifth day thereafter, the boy was inoculated in the Pasteur Institute, Paris, and received treatment for eighteen days, when he was discharged. He frequently complained of pain in his wrists and ankles, and in the abdomen, where the injections were made, and never fully regained his health thereafter. For several weeks prior to his death, he experienced a tingling sensation in his injured hand and arm. On the night of June 19, 1896, he awoke crying with pains in this extremity; during the following day he had convulsions, and violent spasms of the respiratory muscles occurred when he attempted to swallow. He died with characteristic symptoms on June 20th, at 2.30 A.M.

Academy Headache.—Mr. Simeon Snell of Sheffield, England, reports in the *Medical Press and Circular* a form of headache to which he has given the above name. It has long been appreciated by a large number of those who frequent picture galleries that a few hours spent in steadily observing the paintings will almost invariably be succeeded by a headache.   Mr. Snell, while investigating the causes of miner's nystagmus, a disease he has recently discussed in a most classical manner, has also discovered that the reason for these troublesome encephalalgias lies in a strain of the external muscles of the eye—especially the superior rectus and levator palpebræ.   As compared with the other external ocular muscles these are known to be feeble and the continued exertion to which they are subjected, in directing the vision to those pictures hung above the line will readily account for the painful results.   If the head is held well back the necessity for rotating the eyes upward may be obviated in part and the evil effect accordingly diminished.

Appointment of Dr. Barlow.—Dr. Thomas Barlow, Examiner in Medicine at the Victoria University, has been appointed Physician to the Household in Ordinary to Her Majesty.   This honorable position was held, until his recent death, by the late Sir John Russell Reynolds.

The Cholera Bacillus in Europe.—Last week Professor Koch was called to Dantzig to examine the possible source of infection from which one man had died.   The bacillus of cholera was discovered, but Professor Koch expressed his doubt as to its virulence being sufficient to justify fears of an epidemic.

Changes in Belgian Universities.—At both Ghent and Liége the government has made provision for increasing the number of professors in order that special branches of medicine and surgery may be more extensively taught.

CORRESPONDENCE.

QUACKERY IN BELLEVUE HOSPITAL.

To the Editor of THE MEDICAL NEWS:

DEAR SIR: In an editorial in issue of MEDICAL NEWS, dated June 27th, and entitled "The Commissioners of Charities of New York City, and a Secret Cure for Drunkenness," the action of the Commissioners of Charities in allowing quackery to secure a foothold in Bellevue Hospital is *deplored*.

This is certainly moderate language for the harshest insult ever imposed on the Medical Board of Bellevue Hospital since its organization; but for even this installment of independence, the profession at large should feel grateful, as no other medical journal in New York has taken any notice of the matter, much less hurl those anathemas of condemnation at its instigators, which they richly deserve.

Perhaps the editor is not aware of the fact that this secret remedy is owned and controlled by a stock company.   The writer is cognizant of an instance in which a practitioner of this city was offered stock if he would allow his name to be used by the concern; and another, in which the proposition was indignantly refused.

The superintendent plumber lauds the remedy (!).   May he not be another stockholder, anxious to give it a boom and swell his returns ?

The attitude of the Medical Board of Bellevue Hospital in this instance is a matter of no consequence to the Commissioners.   No, Mr. Editor, without a code, without discipline, or penalties, the body medical is in a chaotic state, and it looks very much as if that prophecy of a late venerable physician was about to be realized; who predicted that the time was near when New York would witness the greatest reign of quackery ever known in its history.   When, indeed, does history record such a triumph of charlatanism, with the chief magistrate of a great city to encourage it, and one of the largest hospitals in the world with its portals wide open to receive it ?

                                                          AN OBSERVER.
NEW YORK,
     July 11th.

SPECIAL ARTICLE.

THE COMMISSIONERS OF CHARITIES make the following statement to the MEDICAL NEWS as to the manner in which Ward No. 33 in Bellevue Hospital has been set aside for private experimentation by Dr. Oppenheimer, with his secret remedy for alcoholism: "It was largely due to the suggestion of the Mayor, who had become impressed with the 'cure,' and advised that we consider the question of its introduction into the alcoholic ward of Bellevue Hospital.   In the early part of May the attention of the Commissioners was called to the Oppenheimer treatment, and several cases came to our notice, one under the direct observation of one of the commissioners."   The Medical Board of Bellevue Hospital collectively and individually remonstrated with the Commissioners, but to no avail.   They had the power and were going to use it.   A copy of the charter of the Hygeia Institute, of which Dr. Oppenheimer appears as president, is appended.

CERTIFICATE OF INCORPORATION OF THE HYGEIA INSTITUTE.

THIS IS TO CERTIFY that we, Jay Cæsar Guggenheimer, Theodore L. Hermann, Anthony J. Dittmar, Joseph A. Arnold, and Benjamin F. Kraft, all citizens of the United States, and citizens and residents of the City, County, and State of New York, are desirous of organizing a corporation, and do hereby form a corporation, pursuant to the laws and statutes of the State of New York, and we do hereby make, sign, acknowledge, and file this certificate for that purpose, as follows:

First. The name of the corporation is to be "Hygeia Institute."

Second. The objects for which the corporation is formed and the nature and locality of its business are as follows:

1. To conduct the business of managing hospitals and sanitariums for the cure of persons addicted to the excess-

ive use of alcoholic, malt, or spirituous liquors, intoxicating drinks, or narcotic drugs, in any and all States and Territories of the United States.

2. To buy, sell, exchange, acquire, lease, rent, or otherwise deal in any real estate for the purpose of conducting and carrying on the business above set forth.

3. To apply for, obtain, purchase, or otherwise acquire any patents, brevetes d' invention, licenses, and the like in respect of any inventions and discoveries which may seem capable of being used for any of the purposes of the company, and to use, exercise, develop, and grant licenses in respect of, and otherwise turn into account the same.

4. To cause or allow the legal title, estate, and interest in any property acquired, established, or carried on by the company, and to remain or be vested or registered in the name of or carried on by any other company or companies, foreign or domestic, formed or to be formed, and either upon trusts for or as agents or nominees of this company, or upon any other terms or conditions which the board of directors may consider for the benefit of this company, and to manage the affairs or take over and carry on the business of such company or companies so formed or to be formed, either by acquiring the shares, stocks, or other securities thereof or otherwise howsoever, and to exercise all or any of the powers of holders of shares, stocks, or securities thereof, and to receive and distribute as profits the dividends and interest on such shares, stocks, or securities, and generally to exercise all the powers capable of being conferred by section forty of "The Stock Corporations Law," as amended by chapter 688 of the laws of 1892.

Third. The amount of the capital stock shall be three hundred thousand dollars ($300,000), all consisting of common stock divided into three thousand shares of the par value of one hundred dollars each.

Fourth. The business of the company is to be transacted and located principally in the State of New York, but may be transacted and located in all of the States and Territories of the United States, and in foreign countries.

Fifth. Its principal business office will be in the City, County, and State of New York, but it may establish offices in such other States and Territories, and such foreign countries, as will best promote the purposes of its organization, as above specified.

Sixth. The number of its directors shall be five, each of whom shall be a stockholder, having at least five shares of stock.

Seventh. The names and post-office addresses of the directors for the first year will be as follows :

JAY CÆSAR GUGGENHEIMER, 69 East Ninetieth street,
THEODORE L. HERMANN, 1074 Madison avenue,
ANTHONY J. DITTMAR, 12 East 110th street,
JOSEPH A. ARNOLD, 103 West Seventieth street,
BENJAMIN F. KRAFT, 16 East Seventy-sixth street,
   All in the City, County, and State of New York.

Eighth. The post-office addresses of the subscribers are as above stated, and each of them agrees to take five shares of stock in the corporation.

IN WITNESS WHEREOF, we, the subscribers, have made,

signed, and acknowledged this certificate in duplicate, this 11th day of October, 1894.

<div style="text-align:right">

JAY CÆSAR GUGGENHEIMER.
THEODORE L. HERMANN.
ANTHONY J. DITTMAR.
JOSEPH A. ARNOLD.
BENJAMIN F. KRAFT.
</div>

STATE OF NEW YORK,
CITY AND COUNTY OF NEW YORK, } ss. :

On this 11th day of October, 1894, before me personally came, Jay Cæsar Guggenheimer, Theodore L. Hermann, Anthony J. Dittmar, Joseph A. Arnold, and Benjamin F. Kraft, all to me known, and known to me to be the individuals described in and who executed the foregoing instrument, and who to me severally acknowledged that they executed the same.

<div style="text-align:center">

EDW. J. DWYER,
Commissioner of Deeds,
City and County of New York.

ADDENDUM.
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October 30, 1894: Isaac Oppenheimer, M.D., president; Juliet Mendel, treasurer; and Theo. L. Hermann, the three constituting a majority of the directors of the Hygeia Institute, filed a sworn certificate that the capital stock had been paid in.

SOCIETY PROCEEDINGS.

ONE HUNDRED AND FIFTEENTH ANNIVERSARY OF THE MASSACHUSSETTS MEDICAL SOCIETY, HELD IN BOSTON, JUNE 9 AND 10, 1896.

FRANK K. PADDOCK, M.D., of Pittsfield, President.

THE SHATTUCK LECTURE, "THE SURGERY OF TYPHOID FEVER."

by W. W. KEEN, M.D., of Philadelphia.

HE said that twenty years ago, in delivering the Fifth Toner Lecture, he had discussed the complications and sequelæ of typhoid fever, and he now desired to supplement that lecture with a consideration of the surgery of typhoid fever, more particularly the occurrence of gangrene as a complication. During the last twenty years our views on the pathology of typhoid fever had undergone some very radical changes, but the clinical facts and deductions remain as true now as when the original lecture was delivered.

Singularly enough, he said, the occurrence of gangrene as a complication of typhoid fever, has received but little attention from either physicians or surgeons. Bourgeois, in 1857, had furnished the first serious contribution. One would suppose that gangrene would follow only severe attacks, but a large number of cases had been reported after mild attacks of the disease, so that it behooved the physician to be ever on the alert for its occurrence. It was, however, such a comparatively rare occurrence, that men of such wide experience as Flint and Murclusion have never seen a case. Unlike the bone lesions, gangrene is not a very late sequel. As the presence of the typhoid germs had been demonstrated in the bones eighteen

months, and even six and eight years after the typhoid fever, the late occurrence of the osseous complications could be readily understood. Gangrene, on the other hand, is most commonly observed in the second or third week of the disease, never having been observed before the fourteenth day, or after the seventh week. Its development at this time may be ascribed (1) to the stronger vitality and power of resistance at the beginning; and (2) to the fact that a certain length of time is requisite for the diffusion of the bacilli and their toxic products.

Dr. Keen said, that in his former lecture he had stated that he considered gangrene due to three factors, viz. : (1) the altered blood state; (2) the weakened heart action; and (3) the mechanical difficulty of carrying on the circulation, especially in distant parts; and that all these factors acted by producing thrombi. But since the discovery of the typhoid bacillus, our views had been necessarily somewhat changed. The parts which should be specially subjected to bacteriological examination are: (1) The endocardium; (2) the endocardial clots; (3) the walls of the arteries and veins at the points of obstruction; (4) the thrombi or emboli; (5) the perivascular tissues in this neighborhood; and (6) if no coagula are visible, the gangrenous tissues themselves. Vincent had directed special attention to the significance of mixed infection. Experiment had shown that the staphylococcus was remarkably inimical to the growth of the typhoid bacillus, but that when mixed with streptococci, the typhoid bacilli grew vigorously. In 41 cases of typhoid fever combined with various suppurative processes, it was found that in 32 the complication was due to the aureus or albus. All of these cases recovered in spite of multiple suppuration and periostitis. On the other hand, in 8 cases in which the streptococcus was present, 5 died, showing a striking difference in the fatality of the two varieties of mixed infection. The typhoid bacilli are most numerous in the blood during the first twelve days, and from that time on diminish rapidly, and are only found exceptionally in the fifth or sixth week. They probably reach the blood through the lymphatics. They have been found occasionally in organs which could only be reached by the blood where there is arterial thrombosis, the resulting gangrene is usually dry; but occasionally the veins become obstructed, and then a part or all of a limb may fall into sudden ruin from moist gangrene. Numerous bacteriological examinations now make it reasonable to believe that when the typhoid bacilli are found in pure culture in an abscess, they are its pathological cause.

The speaker said that the cause of the gangrene was obstruction of the circulation, and this obstruction prevented itself in four varieties, viz. : (1) Arterial emboli of cardiac origin; (2) arterial thrombosis arising in the vessel itself; (3) venous thrombosis of the same order; and (4) thrombi in the peripheral vessels. As the circulation was not so completely cut off in venous, as in arterial thrombosis, gangrene was not so likely to result from venous thrombosis. In both varieties, but particularly in the arterial form, the clots are often discontinuous. Occasionally, venous thrombosis was followed by sudden death. Both forms of thrombosis are apt to give rise to a sym-

metrical gangrene which closely resembles Reynaud's disease.

Regarding the symptoms, it might be said that toward the end of the fever, or early in convalescence, a sudden, severe, and persistent pain would be felt either at the seat of the gangrene, or in the obstructed part, and radiating to the periphery. Following this there would be coldness, numbness, discoloration, and the other usual evidences of gangrene. The pulsation of the affected vessel near the gangrenous area would be found quite feeble, and near the obstructed portion the vessel would feel like a cord. When the primary obstruction was in the vein, and was extensive, it was very apt to be symmetrical. In his Toner lecture he had reported 113 cases of gangrene. To this he could now add 90, or a total of 203 reported cases in fifty years. Age had but little influence on gangrene in connection with typhoid fever, but not so with sex, for, out of 155 cases, 90 were males and 65 females. In 214 cases in which the location of the gangrene was studied; in 146 it was in the lower extremities and genitals, and in 16 in such peripheral distributions of the vascular system as the ears and nose. Gangrene, due to venous thrombosis, is most commonly found in the lower extremities, Of 41 arterial cases, 18 occurred in the third week; of 107 venous cases, 40 occurred in the third week—in other words, 58, or 39.2 per cent. developed in the second or third weeks. Just as in gangrene from other causes—often of non-bacterial origin —the legs suffer more than the other parts of the body; but of 46 cases of arterial gangrene, 8 involved both sides, 19 the right side, and the same number the left side. On the other hand, in the venous cases, both sides were affected in only 4 instances, the right in 10, and the left in 38. He was of the opinion that the left side was more often affected, because the left common iliac vein is subjected to compression as it passes under the right common iliac artery. Gangrene of the genitals was more commonly seen in older subjects.

As to treatment, it might well be said that the most important was the preventive treatment, e.g., the securing of good food and air; aiding the flagging heart by alcoholic and other cardiac stimulants, and stimulating the peripheral circulation by faradization. In giving baths great care should be taken to avoid bruising the body or limbs. After gangrene was actually present, the important thing was to keep the parts clean by the application of an antiseptic dressing. In gangrene of the head and neck, operative interference was, of course, limited to the removal of the gangrenous tissue. Where amputation is demanded it should not be done until a final line of demarcation had formed. The leg should be emptied of blood by elevating it, but the elastic bandage should not be employed, but by its compression, an already existing thrombus might be broken up, or septic matter forced into the general circulation. Owing to the obstruction to the circulation, the bleeding will naturally be less than usual, but it should be constantly borne in mind that such patients have not one drop of blood to lose. The surgeon should not delay amputation long after the line of demarcation had formed.

SECTION ON MEDICINE.

DR. A. L. MASON of Boston, chairman.

J. H. McCOLLOM, M.D., of Boston, read a paper on

DIPHTHERIA ANTITOXIN.

He said that diphtheria antitoxin had been on trial for something over three years now, and the consensus of opinion was that it was a remedy of great value in the treatment of diphtheria. In the Boston City Hospital, in 1891, 237 cases of diphtheria was treated, with 105 deaths; in 1892–93, 387, with 185 deaths; in 1893–94, 438, with 203 deaths; in 1894–95, when antitoxin was used in only a few cases, 698 cases were treated with 266 deaths. This gave a total of 1760 cases treated, with 759 deaths, or 43 per cent., which was about the average death-rate in the hospitals, both in this country and in Europe, before the introduction of antitoxin. In the City of Boston, from 1878 to 1894, the average death-rate in the city at large was 30.7 per cent.; the lowest death-rate having been 27.18 per cent., and the highest 35.7 per cent. We thus have a total of 24,813 cases from which to determine the average fatality of the disease. From September 1, 1895, to May 1, 1896, in the Boston City Hospital, 1359 cases were treated with antitoxin, with 170 deaths, or a mortality of 12.51 per cent. Most of these cases were severe. In 1895, 4059 cases of diphtheria were reported to the Board of Health, and 588 deaths, or a mortality of 14.48 per cent. These cases include many mild ones, and some of them were undoubtedly treated with antitoxin, but just how many it was impossible to determine. To show the influence of age, the following statistics were given of the cases admitted during eight months, all of them receiving antitoxin : Seventeen under one year, 3 deaths, or 17.6 per cent.; 74 from one to two years, 20 deaths, or 27 per cent.; 136 between two and three years, 37 deaths, or 27 per cent.; 329 between three and five years, 55 deaths, or 16.7 per cent.; 410 between five and ten years, 39 deaths, or 9.5 per cent.; 187 between ten and twenty years, 9 deaths, or 4.8 per cent., and 206 twenty years old and upward, 7 deaths, or 3.4 per cent. The highest death-rate—27 per cent.—was naturally in those under three years old, yet when this is compared with the death-rate before the introduction of antitoxin—46 per cent.—it is evident that the mortality has been greatly reduced. In all of these cases the antitoxin was administered shortly after their admission, and although a bacteriological examination was made in every instance, it was not thought wise to delay the use of the serum until the result of such examination had been made known. Of the 1359 cases admitted, 53 died within a very few hours after admission; if these were eliminated the mortality would be only 8.9 per cent. If the 74 deaths occurring within 48 hours after admission were included, the mortality would be reduced to 7.4 per cent. In many of the operative cases a very marked improvement followed the use of the antitoxin. Prior to January, 1895, the mortality in the intubated cases was 83 per cent., as against a mortality of 46 per cent. in the last few months. It seems reasonable to suppose that this is due to the influence of the antitoxin. The antitoxin employed in the Hospital was that prepared by Dr. H. C. Ernst, of which the usual initial dose was 5 to 10 cc.

The speaker said that after the injection of antitoxin the membrane would be seen to become detached at the edges and to present an appearance so characteristic that he was willing to assert that he could go through a ward, and, merely by the appearance of the membrane, pick out the cases that had received antitoxin within the preceding forty-eight hours. In no case had the membrane reformed to any extent, and in no instance had there been any serious consequences from the use of the antitoxin. In a few cases in which abscess had occurred, cultures showed a pure growth of streptococcus. Urticaria had occurred in a considerable proportion of the cases, and there had been occasional eruptions, closely resembling either measles or scarlet fever. The local treatment had consisted in irrigations with hot saline solutions. An analysis of 83 cases in which the urine had been examined, both before and after the use of antitoxin, showed the urine free from albumin in 38, a diminution in the albumin in 11, and an increase in 4. In the cases subjected to early treatment, paralysis rarely occurred, but in those coming under observation at a late stage of the disease, paralysis had been observed in a large proportion of cases. In a very large proportion of the cases of diphtheria, the fatal issue was directly due to broncho-pneumonia.

HENRY JACKSON, M.D., of Boston, read a paper entitled

TREATMENT OF DISEASES OTHER THAN DIPHTHERIA BY ANTITOXINS.

He said that as yet the composition of antitoxin was not definitely known.

In 1893 Klempe reported six cases in which he had tried upon the human subject, for the relief of pneumonia, injections of the pneumococcus, and, he thought, with fairly good results. So far, however, no practical benefit has been derived from this line of treatment. Theoretically, we ought not to expect to cure a lung, already diseased, by injections of this character; all that we ought to hope for would be the prevention of further extension of the disease process.

Regarding tetanus, it was to be noted that clinically it was most commonly found in injuries to the extremities 84 per cent. in a series of 395 cases. In 1885, Nicolai had found that garden earth produced this disease, and in 1886 Rosenbach succeeded in producing tetanus in the lower animals by injecting them with flesh from a person ill with the disease. He also described the bacillus, although he did not succeed in getting it pure. As the tetanus bacilli grow by spore formation, it is difficult to kill them. It should be remembered, however, that while they resist the action of strong chemicals, they are destroyed by boiling for five minutes. In 1890, Behring and Kitasato (?) published an article on the immunity of man and animals from tetanus by the use of injections, claiming not only to be able to produce immunity, but to cure one already affected with the disease. Other observers, however, had failed to confirm these claims made by Behring as to the *curative* property of the serum. An analysis, the speaker said, had been attempted in the case of this

antoxin, with the following results: (1) It is an albu-
minoid body, being destroyed by a temperature of 68° C.,
but not affected by a temperature of 60° C.; (2) it cannot
be dialyzed; (3) mineral acids destroy it, and (4) when
dried *in vacuo*, it retains the original properties of the
serum.

A study of a large number of cases gives a mortality of
80 to 90 per cent. in the acute, and 50 per cent. in the
chronic form. The longer the duration of the disease
after the onset of the symptoms, the better the prognosis.
So far as he had been able to ascertain, the antitoxin had
been used in 44 cases, in 40 of which the disease had fol-
lowed injuries to the extremities. The mortality was 36
per cent. Of the 27 cases that recovered, the period of
incubation in more than half of them was between the
fifth and fifteenth day. One case was referred to in
which the symptoms had been very slow in developing—
not until the nineteenth day. When they did develop,
however, they were terribly severe. Gibier's tetanus an-
titoxin was then injected, and with such marked benefit
as to make it incumbent upon the physician to give this
treatment a trial in every case of tetanus.

Extensive experiments, Dr. Jackson said, had been
carried on by Marmorek with the antistreptococcus serum.
He claims that the injection of a daily dose of ten cc. of
the serum causes both general and local improvement,
and a fall of temperature. The compound serum—that
of horses immunized both for diphtheria and the strepto-
coccus—was also said to yield good results. The general
consensus of opinion, however, regarding the use of the
antistreptococcus serum in puerperal cases was against
its use, the mortality being 42 per cent.

Marmorek had treated 96 cases of scarlatina with the
antistreptococcus serum, using a serum of 1-30,000, and
giving it in doses of 10 cc. Ten of the cases were com-
plicated with diphtheria, and were treated with the
double, or compound serum. Nineteen of the cases had
enlarged glands, but in not a single case did suppuration
occur. On the other hand, it should be noted that Bagin-
sky had treated 48 cases, in several of which the enlarged
glands suppurated. His mortality in these cases was 14
per cent. as against a previous mortality of 22 to 30 per
cent. Dr. Jackson said that he had found that in 646
cases of scarlet fever at the Boston City Hospital, the
mortality was about 9 per cent.

It was natural, he said, that in a diseases like pulmon-
ary tuberculosis, serumtherapy should be tried; for
pathologists tell us that in 20 to 25 per cent. of autopsies
on cases not known to be tubercular, cicatrices or cheesy
deposits are found demonstrating a healed tuberculosis.
Improvement had been reported in tuberculosis from
serum injections, but it was much the same story as had
been told so many times before in connection with the
many new methods of treating this disease.

Le Grand had reported an epidemic of 40 cases of
typhus fever in a prison with 12 deaths. Recourse was
then had to serumtherapy, the serum being taken from
those who had just recovered from the disease. Only one of
the 39 cases so treated, died. Following the use of the
serum, it was noted that there was a fall of temperature,

an improvement in the pulse and a diminution in the
coma.

One case had been reported in which there had been
rapid recovery from a cerebrospinal meningitis after the
injection of serum taken from a sister of the patient, who
had just recovered from the disease.

DR. H. C. ERNST of Boston, in opening the discussion,
referred to various important and comparatively little
known properties of the blood-serum. He said that its
globucidal power—*i.e.*, its power to destroy blood-globules
—had been especially made use of by the opponents of
antitoxin, claiming that this was one of the possible
causes of the disastrous results which they thought were
attributable to the use of the antitoxic serum. Other
properties of the blood-serum needing further study were
its attenuating power, its coagulating power, and its toxic
power. Its antitoxic power was, so far as now known,
the most important of all. Behring had been led to look
into this particular feature by the vitality of the bacteria
at the point of inoculation, when injected into animals
immune to these bacilli. For example, if the anthrax
bacilli were injected into a person immune to anthrax,
the germs would continue to grow and still there
would be no symptoms of anthrax. This suggested
the belief that it was not the bacteria but their tonic
products, which were the active cause of such dis-
eases.

Dr. Ernst said that the exactitude and accuracy of
the laboratory experiments upon which the diphtheria
antitoxin treatment were founded, had been demonstrated
again and again. The clinical evidence of its value
had just been fully presented by Dr. McCollom. He
would present the following additional statistics: He
had received reports from 181 cases, outside of the
Boston City Hospital, with 15 deaths, or a mortality
of only 8.2 per cent. In 346 other cases, doses
of 3 to 5 cc. of antitoxin were used for immunizing
purposes. Of this number there was no case of albu-
minuria or paralysis, and no severe or permanent symp-
toms had developed. This would seem to show
conclusively that antitoxin is not harmful. He would
conclude, therefore, that in the hands of a competent
person, antitoxin, when properly prepared and properly
administered, was of the greatest value in the treat-
ment of diphtheria. Much had been published, more
particularly in the daily papers, regarding the position
taken by Dr. Winters of New York, in regard to this
treatment. The speaker said that he had very recently
had the pleasure of listening to a discussion on this
subject in New York, and all that he need say was
that all of Dr. Winters' colleagues, who had seen the
same cases as he, had avowed their belief in the anti-
toxin treatment. It appeared at that meeting that Dr.
Winters' arguments were largely based upon a misinter-
pretation of facts.

DR. T. M. ROTCH of Boston, said that in a large
number of cases, collected from private practice by the
American Pediatric Society, an equally low death-rate to
that given to-day, had been reported as following the
antitoxin treatment.

Dr. W. T. Porter of Boston, in presenting a paper on

INTERNAL SECRETION OF GLANDS,

Said that a modern definition of a gland was one or more epithelial cells, opening on one side into a cavity, into which the secretion of the cells is discharged. Such a definition would include both the uni-cellular glands of the alimentary canal and respiratory tract, and the so-called ductless glands—*e.g.*, the thyroid. But this definition does not include all glands. Certain cells extrude their products directly in the lymphatics, as for example, the hepatic cells, which convey glycogen and urea directly to the lymph channels. The term "internal secretion" should be confined to the manufacture of all secretory products which enter the lymphatics and blood, including not only those passing directly from the mother gland into the surrounding liquid, but all those resorbed from the gland cavities. The reader of the paper then referred to recent observations on pancreatic diabetes. It had been found, he said, that diabetes was due to the failure of an hitherto unknown function of the pancreas—*i.e.*, the using up of part of the sugar in the blood. He said that in 1882, Reverdin had first called attention to the peculiar cachexia following the removal of the thyroid gland from the human subject, and the marked effect upon the general health, upon the speech, and even upon the intellection. In 1885, Horsley had produced myedema experimentally by removing the thyroid from the monkey. It had also been found that the total removal of the suprarenals causes death, but that this might be averted by leaving a small portion.

Regarding the internal secretion of the testis, the speaker said that the assertions of Brown-Sequard, regarding the virtues of the testicular extract, had been since confirmed by other observers. Perhaps not the least remarkable facts in connection with the subject of internal secretion of glands were those illustrated by experiments in transplanting the thyroid and the pancreas to any part of the body where a proper vascular supply could be maintained, without producing the disastrous results well known to follow the entire removal of these glands.

R. C. Cabot, M.D., of Boston, read a paper upon

CLINICAL USE OF PREPARATIONS FROM THE THYROID PITUITARY BODY, SUPRA-RENAL CAPSULE, AND BONE-MARROW.

(To appear in an early issue of Medical News.)

Dr. H. P. Bowditch of Boston, said he saw no reason why extracts of glands should not be as likely to be beneficial as an extract from a nut, or a root or a leaf. He was inclined to think that they would play an important part in the therapeutics of the future. He had tried pancreatic extracts in a number of cases of diabetes, but with absolutely negative results.

It was arranged that the Surgical Section should present a series of five-minute papers setting forth the present aspect of orthopedic surgery. Twelve papers were then read by as many different members.

<div align="center">(To be continued.)</div>

REVIEWS.

Occasional Papers on Medical Subjects. By Dr. W. Hawship Dickinson, Longmans, Green & Co., London, New York, and Bombay; 1896.

This volume of 250 pages is made up in great part of opuscles that have appeared in medical journals during the past forty years, a period covering the active professional life of one who has made his name honorably known in medical literature. The diversity of topics discussed and the catholicity of the writer is shown by a glance at the table of contents, which includes among the seventeen subjects treated such widely different subjects as the "Action of Digitalis on the Uterus," the "Changes in the Nervous System which Follow the Amputation of Limbs," the "Pathology of Chorea;" "Chorea, with Reference to its Supposed Origin in Embolism," an article which has been referred to so frequently, that it has become somewhat of a classic; "Hereditary Albuminuria," "The Morbid Effects of Alcohol, as Shown in Persons Who Trade in Liquor," and finally, a pleasant reminiscent article entitled "The Practice of Medicine at St. George's Hospital Forty Years Ago." In the last-mentioned article, Dr. Dickinson is at his best, both in point of style and handling of his subject. His protracted and intimate connection with St. George's Hospital, first as clinical clerk, then as physician, and now as consulting physician, has given him opportunity to be realistic in a charming manner, by contrasting the state of medical practice in the early part of the century with the conditions existing to-day, which are portrayed in many of the articles in the volume.

Some of his remarks indicate how completely the pendulum has swung from therapy to diagnosis, such for instance as when discussing the clinical records made by the great Thomas Young, whom he eulogizes by referring to as "the most comprehensive genius and greatest man of science who ever held the office of physician to St. George's or any other hospital;" he says, "these notes are ample and minute in treatment, but without any clinical features except an occasional word of diagnosis, and here and there a brief note of *post-mortem* appearances. Pithily expressed, the treatment of disease has advanced in the last forty years, not so much in the direction of what to do as what not to do. And then what a volume of truth and honest expression of experience is summed up in the words "We trust nature more—we have learned the use of potassium iodid."

Of the many articles in the volume of permanent scientific importance, two in particular may be mentioned, "A Lecture on the Cardio-vascular Changes of Renal Disease, with Some Observations on the Large Arteries," which appeared originally in the *Lancet* of July 20, 1895, and on the "Presystolic Murmur Falsely So-called." In the latter, the author ably contends against the origin of a murmur in auricular contraction, the theory of Fauvel, which was so earnestly advocated by Gairdner in Great Britain, but which now has few believers.

Some of the papers have a historical interest, especially that on the "Action of Digitalis on the Uterus," and on the

"Pathology of Chorea," but each one of the articles sustains the liveliest interest, and is profitable, suggestive reading. It is a pleasure to recommend a medical book in which dogmatic and dictatorial statements are consigned to the background, and the plain statement of a ripe experience is put to the fore.

URIC ACID AS A FACTOR IN THE CAUSATION OF DISEASE. A CONTRIBUTION TO THE PATHOLOGY OF HIGH ARTERIAL TENSION, HEADACHE, EPILEPSY, MENTAL DEPRESSION, PAROXYSMAL HEMOGLOBINURIA AND ANEMIA, BRIGHT'S DISEASE, DIABETES, GOUT, RHEUMATISM, AND OTHER DISORDERS. By ALEXANDER HAIG, M.A., M.D., Oxon., F.R.C.P., etc. Third edition, with 54 illustrations. Philadelphia: P. Blakiston, Son & Co., 1896.

IN this volume of 600 pages, the author has practically republished and amended his former writings on the influence of uric acid as a factor in the causation of disease. To the rather formidable list of diseases mentioned on the title page, Raynaud's disease, hysteria, and asthma might be added, and the list would be quite complete. If the reader will always bear in mind that uric acid is *a* factor, and not *the* factor, such a book as this will do no harm; but we fear, with all due deference to Dr. Haig's extensive researches, that he is trying to prove too much, and that the relative worth of other etiological factors (in epilepsy and hysteria, for instance) will be underrated in consequence of his insistence on uric acid. To take epilepsy, again, a certain coterie of medical men hold that epilepsy is due chiefly to eye-strain. Haig says uric acid is the powerful provocative agent in the functional cases. Which one is it, or is it neither? A change in the amount of uric acid excreted does not prove the case, particularly since it is still doubtful whether the excess of uric acid in the blood is the cause, or the result of, an epileptic seizure.

A single paragraph from the chapter on Raynaud's disease will show Haig's general method of argumentation. To say that it is a trifle vague, is to put it mildly. This paragraph reads:

"The fact is, that in uricacidemia the vessels all over the body are obstructed, and all the most important organs and tissues give evidence that their functions are thereby disturbed; and the relation between Raynaud's disease and certain neuroses, such as hysteria, epilepsy, and the headache and mental depression of which I have spoken, amounts simply to this: that they are all effects of uricacidemia, and for this reason often occur together, and these disturbances . . . merely prove that the disturbance of circulation which produces the gangrene in the extremities produces also such changes in the intracranial circulation that certain contemporaneous changes in the functions of the great nerve-centers result."

Has it ever occurred to Dr. Haig to inquire, if his reasoning be correct, why Raynaud's disease is not a very common affection in those having epilepsy, hysteria, or migraine?

We have no intention of speaking disparagingly of Haig's researches. His facts may be well-founded, though

some of them have been opposed by Herter and others, but the inferences drawn therefrom are hazardous. The author attempts to prove too much. He has done good work, however, in calling the attention of the profession to the importance of uric acid as an etiological factor in many diseases; and to those who wish to know all that can be said in favor of uric acid, this book will be welcome.

CHANGES IN THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING JUNE 20, 1896.

June 12th.—Surgeon R. WHITING, detached from the "Monterey," ordered home and granted three months' leave.

Surgeon C. T. HIBBETT, detached from the "Bennington" and ordered to the "Independence."

Surgeon H. T. PERCY, detached from the Board of Examiners, Washington, D. C., July 1st, and ordered to the "Monterey."

Surgeon W. A. McCLURG, ordered as member of Medical Examining Board, Washington, D. C.

Passed Assistant Surgeon J. W. BAKER, detached from Board of Examiners, New York, June 22d, and ordered to the "Bennington."

Passed Assistant Surgeon C. F. STOKES, ordered as recorder of Medical Examining Board, New York, June 22d.

June 13th.—Surgeon A. C. RUSSELL, detached from Board of Medical Examiners, New York, July 5th, and granted leave until August 7th, with permission to go abroad.

Assistant Surgeon M. K. JOHNSON, detached from the "Franklin" and ordered to the "New York."

Assistant Surgeon F. C. COOK, detached from the "New York" and ordered to treatment at Naval Hospital, New York.

June 15th.—Assistant Surgeons W. N. WHEELER and R. S. B AKEMAN, ordered to instruction at naval laboratory, New York.

Passed Assistant Surgeon J. W. BAKER, ordered to delay reporting until July 18th.

CHANGES IN THE MEDICAL CORPS OF THE U. S. NAVY FOR THE WEEK ENDING JUNE 27, 1896.

June 23d.—Assistant Surgeon S. B. PALMER, detached from the New York Laboratory, June 29th.

June 26th.—Passed Assistant Surgeon GEO. ROTHGANGER, detached from the "Independence," July 15th, and ordered to the "Oregon."

OFFICIAL LIST OF THE CHANGES OF STATION AND DUTIES OF MEDICAL OFFICERS OF THE U. S. MARINE HOSPITAL SERVICE FOR THE TWENTY DAYS ENDING JUNE 20, 1896.

McINTOSH, W. P., Passed Assistant Surgeon, to proceed from Louisville, Ky., to Cincinnati, Ohio, to inspect unserviceable property; then to rejoin station, June 13, 1896.

PERRY, J. C., Passed Assistant Surgeon, granted leave of absence for twenty days, June 20, 1896.

GARDNER, C. H., Assistant Surgeon, order of May 27, 1896, directing him to report for examination revoked June 5, 1896.

BLUE RUPERT, Assistant Surgeon, to proceed from San Francisco, Cal., to Angel Island Quarantine Station for duty, June 18, 1896.

OFFICIAL LIST OF CHANGES IN THE STATIONS AND DUTIES OF OFFICERS SERVING IN THE MEDICAL DEPARTMENT, U. S. ARMY, FROM JUNE 2, 1896, TO JUNE 22, 1896.

Captain Louis A. LaGarde, Assistant Surgeon, U. S. Army, is granted leave of absence for one month.

Captain Philip G. Wales, Assistant Surgeon, is relieved from temporary duty at Fort Monroe, Va., and will return to his proper station, Fort McPherson, Ga.

Leave of absence for one month, with permission to apply for an extension of one month, is granted Captain W. Fitzhugh Carter, Assistant Surgeon.